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Manual
IMPACT20 PROFINET IO

- System Description
- Configuration
- Mounting and Installation
- Bus System PROFINET IO
- Diagnostics and LED Dislays
- Technical Data

Publisher's Note

PROFINET IO	IMPACT20 PN DI16	Article Number: 56 920
	IMPACT20 PN DI8 DO8	Article Number: 56 921
	IMPACT20 PN DO16	Article Number: 56 922

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Service and Support

Website:

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In addition, our Customer Service Center (CSC) will be glad to assist you:

Our Customer Service Center can support you throughout your project during planning and the conception of customer applications, configuration, installation, and startup. We also offer competent consulting or – in more complex cases – we even provide direct onsite support.

The Customer Service Center provides support tools. It performs measurements for fieldbus systems, such as PROFINET DP, DeviceNet, CANopen, and AS interface, as well as energy, heat, and EMC measurements.

Our coworkers at the Customer Service Center provide their competence, know-how, and years of experience. They are familiar with how products made of various hardware and software manufacturers interact.

You can contact the Customer Service Center at

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or by email at csc@murrelektronik.de.

About the User Manual and its Structure

Bus Manual:
General explanations and functions for each bus.

On this subject, please click on the links to the next page.

System/Product Manuals:
Describe the system and product-specific features.

Art. No.	Designation
56931	IMPACT20 Profibus
56932	IMPACT20 CanOpen
56933	IMPACT20 DeviceNet
56934	IMPACT20 EtherCat
56935	IMPACT20 EtherNet/IP
56936	IMPACT20 ProfiNet

www.murrelektronik.com

The following links will provide you with more information on bus systems, as well as the standards and specifications on which they are based:

>>> PROFINET (www.PROFINET.com)

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Important Information

Basic Knowledge Required

This manual contains general information on the system and the product.

To understand this manual, you need to know about automation systems.

Symbols and Icons

This manual contains information and instructions you must comply with in order to maintain safety and avoid personal injury or damage to property. They are identified as follows:

Notes indicate important information.

Warnings contain information that, if ignored, may cause damage to equipment or other assets or, if you fail to comply with safety precautions, may constitute a danger to the user's health and life.

These instructions are recommendations issued by Murrelektronik.

Intended Purpose

Before starting the devices, read this manual carefully. Keep it in a location that is accessible to all users at all times.

The products that are described in this manual were developed, manufactured, tested, and documented in compliance with the relevant safety standards. In normal cases, these products do not constitute any danger to persons or objects, provided the handling specifications and safety instructions described in this manual are observed. They meet the specifications of the European EMC Directive (2004/108/EC).

WARNING

Devices from the IMPACT20 series are not safety devices conforming to the relevant standards.

Do not use the OFF state of the outputs to implement safety-related requirements of the system/machine.

The products are designed for industrial use. An industrial environment is defined as one in which loads are not connected directly to the public low-voltage power grid. Additional measures must be taken if the products are used in private, business, or trade environments.

The safe, troublefree functioning of the products requires proper transportation, storage, mounting, and careful operation. Operation of the devices for their intended purposes is only guaranteed when the devices are fully mounted.

Current safety and accident prevention laws valid for a specific application must be observed for the configuration, installation, setup, maintenance, and testing of the devices. The power supply must comply with SELV or PELV. Power sources in accordance with EN 61558-2-6 (transformer) or EN 60950-1 (switched-mode power supply) meet these requirements.

Only use cables that meet the requirements and regulations for safety, electromagnetic compatibility, and, if necessary, telecommunications terminal equipment specifications.

Information on cables and accessories made by Murrelektronik GmbH for this product is contained in Chapter Accessories.

Qualified Personnel

Only qualified, trained electricians knowledgeable in the safety standards of automation systems may configure, install, set up, maintain, and test the devices. The requirements concerning qualified personnel are dependent on the requirements profiles described in ZVEI and VDMA. For this reason, electricians must know the contents of the manual "Weiterbildung in der Automatisierung" (Further Training in Automation Systems) issued by ZVEI and VDMA and published by Maschinenbau-Verlag, Post Box 710864, 60498 Frankfurt, Germany) before installing and maintaining the devices. They are therefore electricians who are capable of assessing the work executed and any possible dangers arising from this due to their professional training, knowledge, experience, and their knowledge of the pertinent standards; or who have a level of knowledge equivalent to professional training due to their many years of activity in a comparable field.

Only Murrelektronik technical personnel are allowed to execute work on the hardware and software of our devices, if they are devices not described in this manual.

Unqualified tampering with the hardware or software, or failure to observe the warnings cited in this manual may result in severe personal injury or damage to property.

1 System Description

1.1 Description of the Impact20 Product Family

IMPACT20 is a compact fieldbus I/O station. It combines 8 inputs and 8 outputs or 16 inputs or 16 outputs in a confined space. Due to its compact dimensions, the IMPACT20 is designed for use in switch cabinets, terminal boxes, and on control panels. An IMPACT20 module comprises a fieldbus-specific connection and a fixed number of I/O slots. The I/O functions are module-dependent and are unchangeable. All I/O connections are designed as spring-loaded clamping terminals. They are clearly arranged so that functional relationships are logically recognizable.

The IMPACT20 product family groups signals at I/O level decentrally and places this information on the fieldbus (e.g. Ethernet/IP).

Fieldbus Protocols

Impact20 is supplied for the following fieldbus protocols:

- PROFIBUS
- CANopen
- DeviceNet
- EtherCAT
- Ethernet/IP
- PROFINET IO

Module Variants

- Module with 16 digital inputs
- Module with 8 digital inputs and 8 digital outputs
- Module with 16 digital outputs

Functions

- Easy to recognize, directly assigned status and diagnostic LEDs
- Clear, unmistakable slot designation
- Signal identification on the module
- Terminal-specific disconnection in the event of an error
- Group diagnostic and single-channel short-circuit diagnostic over the bus

1.2 System Components

1.2.1 Product Designation Code

The designation of the IMPACT20 product family is based on a scheme that indicates the fieldbus and I/O function of individual devices.

Examples:

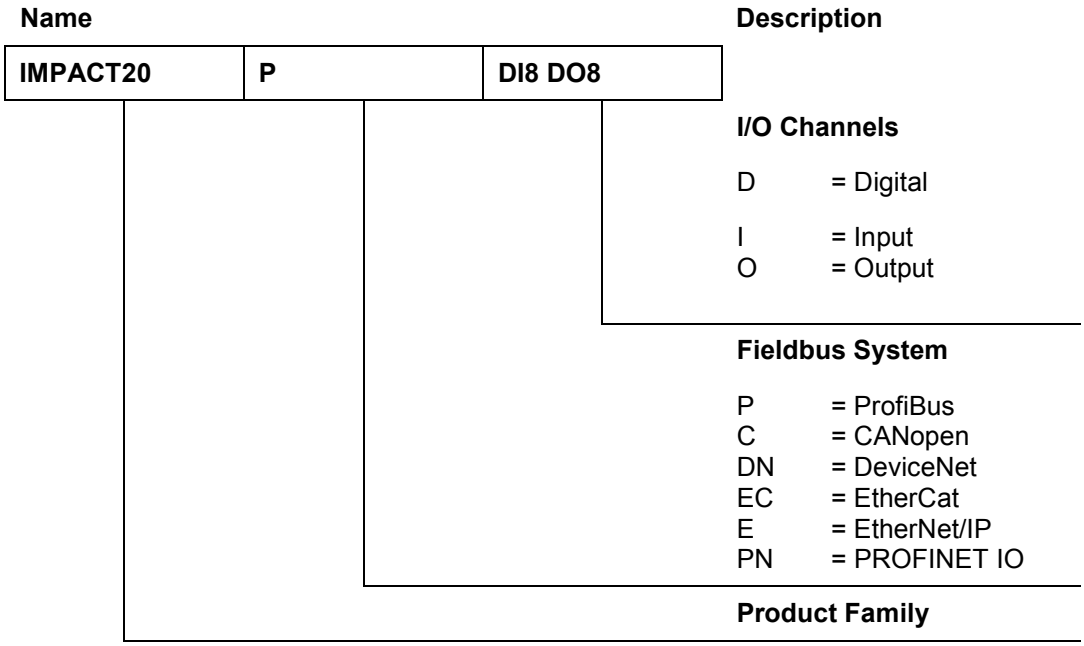

Fig. 1: Example of product designation

1.2.2 Product Overview

Article Number	Description
56 920	IMPACT20 PN DI16
56 921	IMPACT20 PN DI8 DO8
56 922	IMPACT20 PN DO16

Table 1: PROFINET I/O fieldbus modules

1.2.3 System Design Principle

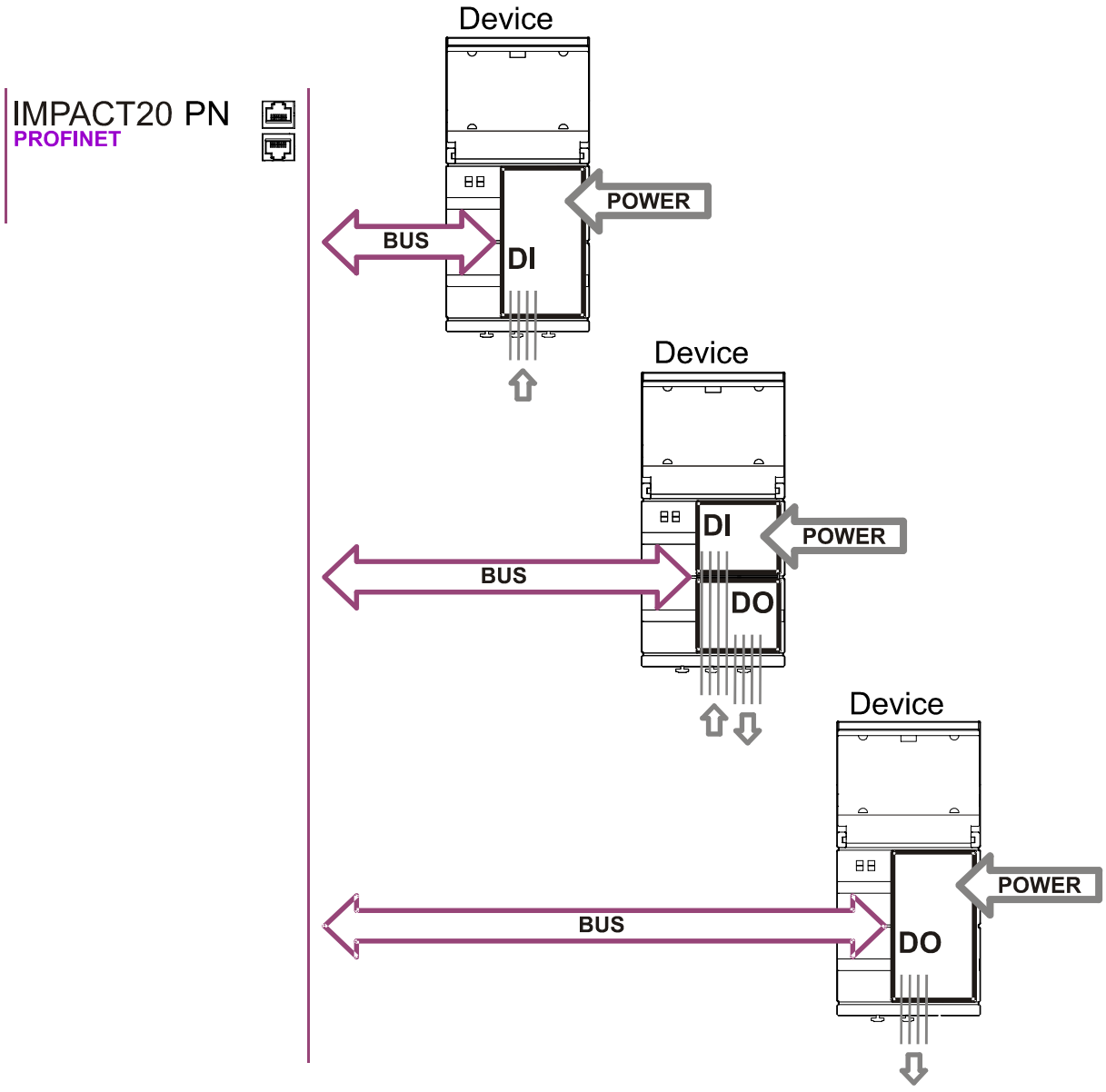

Fig. 2: System design principle

2 Configuration

This chapter contains information that is relevant during the electromechanical planning phase.

2.1 Power Supply

2.1.1 Configuration Notes

Bus modules require a DC voltage power supply of typically 24 VDC (SELV / PELV) that must comply with the regulations for conventional industrial power supplies.

To optimize immunity from interference, we advise you to tap sensor, bus and actuator power supply from a number of different power sources. Primary switched-mode or regulated power supplies should be used.

Power supply unit performance is dependent on the number and power requirements of the connected users.

In any case, make sure that the system voltage – measured at the most remote slave – does not drop below 18 VDC when viewed from the system power supplies. System response becomes undefined if the sensor and bus power supply drops below 18 VDC. IMPACT20 modules then generate an undervoltage diagnostic visually and over the fieldbus.

Primary switched-mode power supply units generally permit an increase in output voltage via nominal voltage in order to compensate for line losses.

Modules with digital inputs support the direct connection of commercially available sensors. Depending on the total power requirements resulting from the number of slaves, or the use of sensors with high power consumption, a separate power supply may be required for the sensors.

2.2 Galvanic Isolation

To optimize electromagnetic compatibility and increase bus stability, the bus must be galvanically isolated from the remaining electronics.

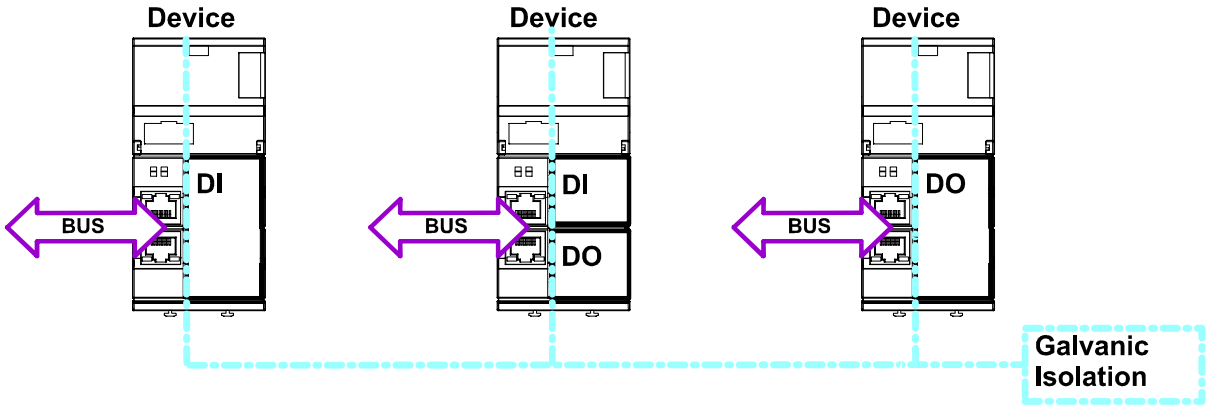

Fig. 3: Impact20 modules – galvanic isolation

2.3 Electromagnetic Compatibility (EMC)

The units comply with the requirements of EC Directive 2004/108/EC "Electromagnetic Compatibility".

These units conform with Class A devices. They may cause radio interference in residential areas. In this case, the operator may be required to implement suitable countermeasures.

The devices described in this manual meet the relevant standards for electromagnetic compatibility in themselves. However, this does not assume that their electromagnetic compatibility is also guaranteed when built into a system.

For this reason, the user is urgently advised to observe the instructions below concerning installation in accordance with EMC requirements.

Protection Against Electrostatic Discharge

The products described in this manual contain complete semiconductor components that may be destroyed or damaged by electrostatic discharge (ESD).

Damage does not necessarily lead to an immediately detectable failure or malfunction. However, it may become evident with a delayed reaction or sporadically.

When handling these devices, make sure that the safety precautions for ESD-sensitive devices that are well-known in general practice are maintained. In particular, note the following items:

Do not disconnect or connect plugs or connectors live.

The person handling the devices must discharge themselves electrostatically before they come in direct contact with the devices, e.g. by touching a grounded part of the system, or by wearing an ESD antistatic wrist strap connected to ground.

Grounding

A short (as short as possible) low-impedance connection is required between the grounding point and reference ground to discharge interference voltages that act between the device and reference ground.

The inductance of normal FE cables represents a high impedance for high-frequency interference voltages.

Make sure that the DIN mounting rail, on which the device is mounted, has a low-impedance connection to ground.

Wiring Arrangement

Avoid EMC problems by keeping to the following basic rules of wiring arrangement:

- Route the data wiring at the greatest possible distance from the power lines. Keep a minimum distance of 10 cm.
- Only cross data and power lines at right angles.
- Route data wires and power cables in separate, shielded ducts.
- Take into consideration the potential interference of other devices or wires when arranging wires.
- Keep the greatest possible distance from frequency converters, motor cables, and other devices, and from cables that emit high-frequency interference.

Power Failures and Dips

Transient power failures and dips (<10 ms) do not normally impair operation since the power supply to the electronics is buffered by integrated capacitors. However, this does not apply to the power supply of sensors and actuators connected to the module. Their high power demand can not be met by capacitors integrated in the device. For this reason, short-term interruptions in actuator voltage may cause undesired switching operations.

If an input signal that lasts for less than 1 ms changes, the input filters prevent the change of the input state reported to the controller. Longer interruptions to sensor power supply may lead to an input signal change.

Separate Power Supplies

Sensors and actuators can be powered by a separate power supply unit. A separate power supply improves the electromagnetic compatibility of the overall system.

Suppression of Inductive Loads

The outputs of the devices described in this manual have an integrated protection circuit against high-energy interference voltages, e.g. that occur when inductive loads are switched.

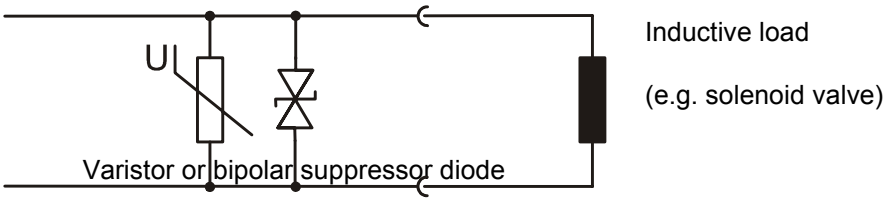

Fig. 4: Suppression of Inductive Loads

A suppressor diode guarantees rapid reduction in the energy stored in the magnetic field of an inductive load. However, with inductive loads, e.g. loads within the maximum current carrying capacity range of a channel and at switching frequencies > 1 Hz, we advise the use of commercially available protection circuits that are capable of reducing the energy stored in the connected inductances.

The high voltages when inductive loads are switched off generate strong fields in the wiring and this may lead to interference in adjacent circuits or devices.

Murrelektronik offers a wide selection of suppressor products. Refer to our catalog or visit our inline shop at
www.murrelektronik.com

Other Measures and Limits

In specific system configurations, the requirements for interference emission and immunity from interference can only be met with additional measures since the EMC within a system is dependent on the individual components made by other manufacturers.

Mains filters are a suitable measure to reduce cable-bound interference. Various manufacturers offers optical-fiber converters. This type of data transmission is basically immune to EMC interference. However, it does not apply to the converter electronics. Therefore, use of fiber-optics does not eliminate all EMC problems.

Our accredited test center will answer any further queries you may have concerning EMC. There you will receive advice on certain methods to conform with the EMC Directive for the systems you have built.

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3 Mounting and Installation

3.1 Mounting

3.1.1 Mounting IMPACT20 Modules on DIN Mounting Rails

Make sure that the DIN mounting rail, on which the device is mounted, has a low-impedance connection to ground.

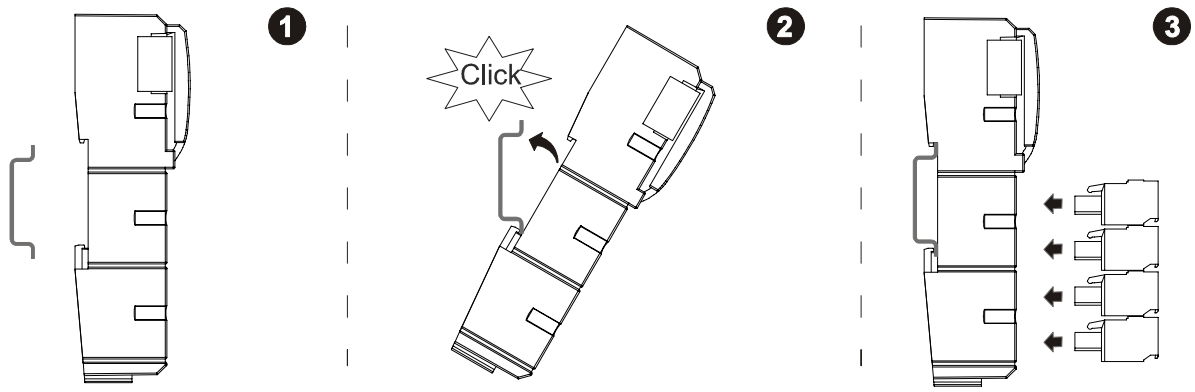


Fig. 5: Mounting IMPACT20 modules on DIN mounting rails

3.1.2 Distances

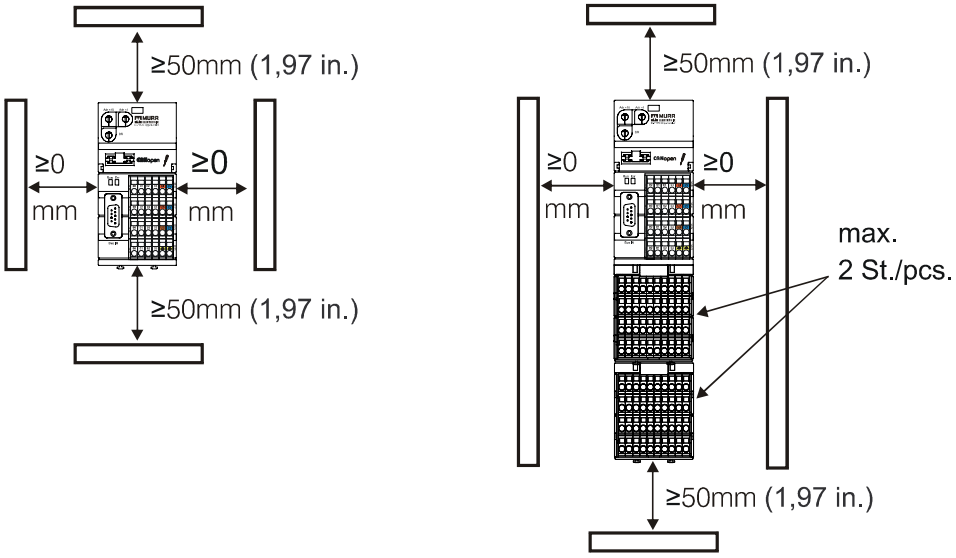


Fig. 6: Distances

3.1.3 Installation Position

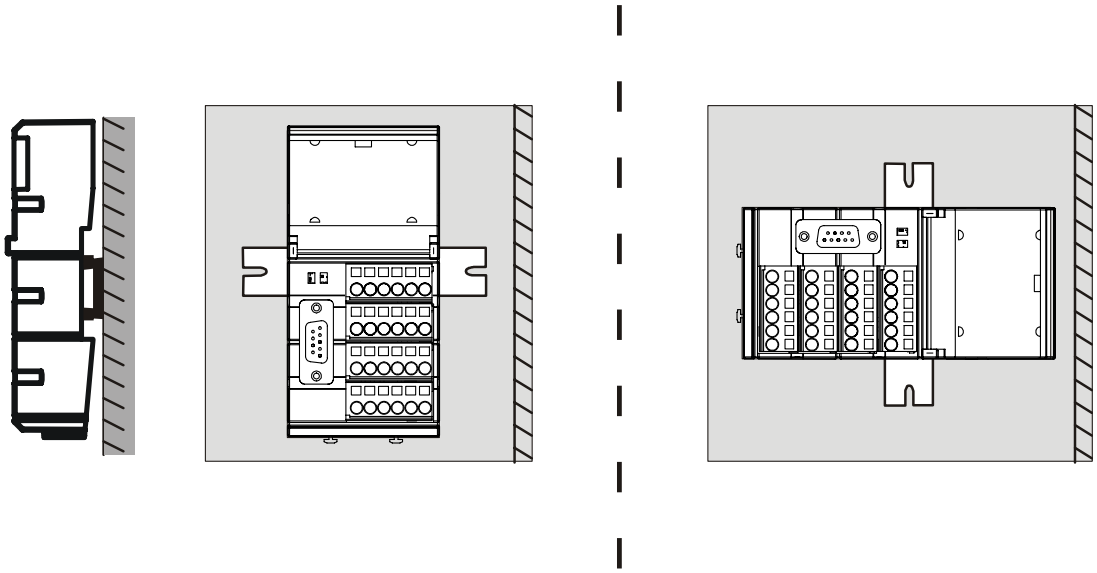


Fig. 7: Installation position

3.2 Wiring the Plug-in Terminal

3.2.1 Connecting Sensors and Actuators

WARNING

Devices from the IMPACT20 series are not safety devices conforming to the relevant standards.

Do not use the OFF state of the outputs to implement safety-related requirements of the system/machine.

3.2.1.1 Sensor Power Supply

Sensor can be powered by the IMPACT20 module. The sensor power supply is protected by a self-resetting short-circuit proof transistor for each module. The maximum current draw for the sensor power supply is 0.7 A per module.

3.2.1.2 Actuators

The maximum current draw of IMPACT20 modules per channel is 2 A. Please remember that the maximum total current of 8 A at the UA terminal may not be exceeded.

CAUTION

If the polarity of the module and actuator power supplies are reversed, this may damage the module.

3.2.2 Terminal Overviews of IMPACT20 Modules

3.2.2.1 DI16 Modules

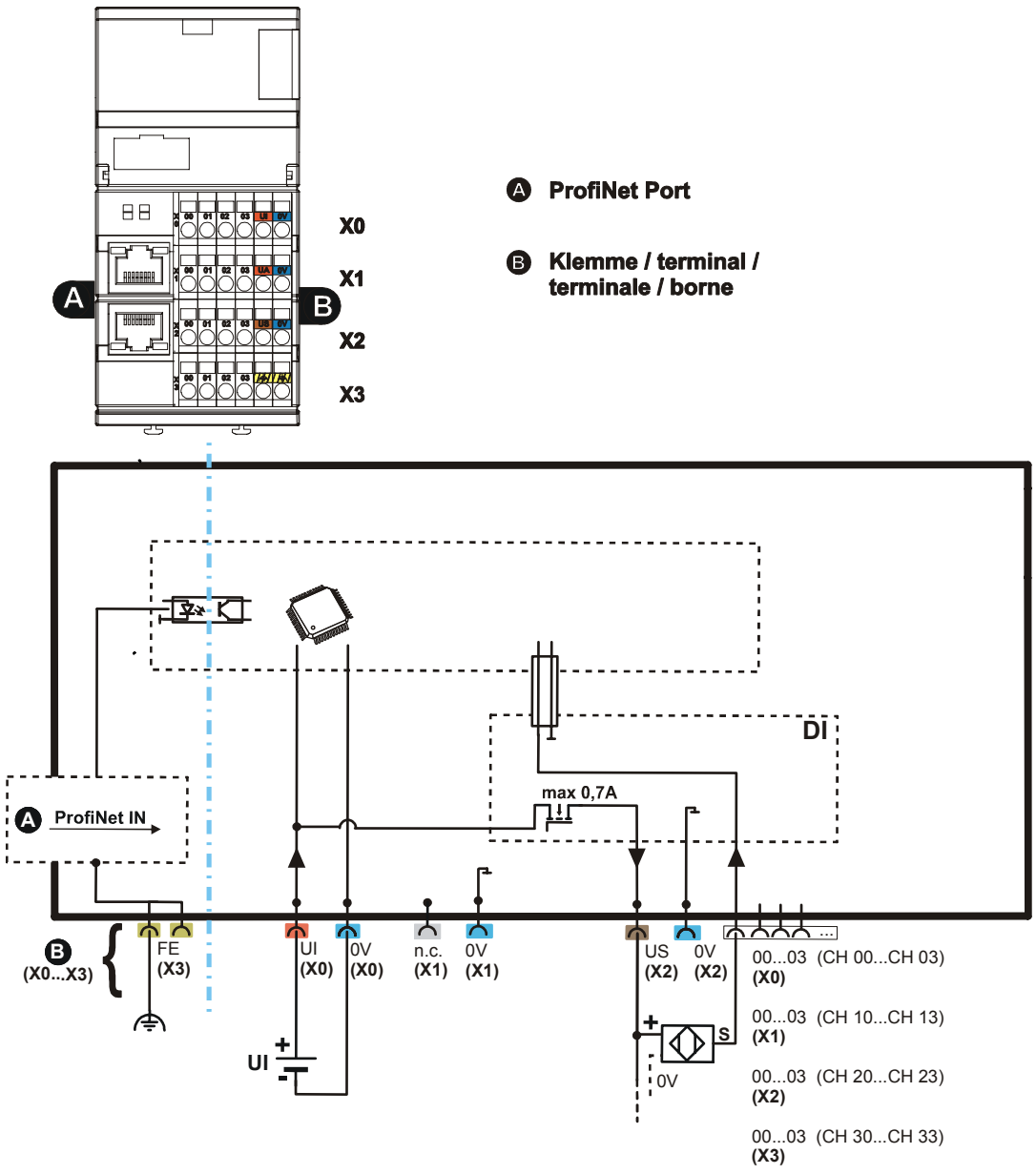


Fig. 8: Terminal Overview of Impact20 DI16 Modules

3.2.2.2 DI8 DO8 Modules

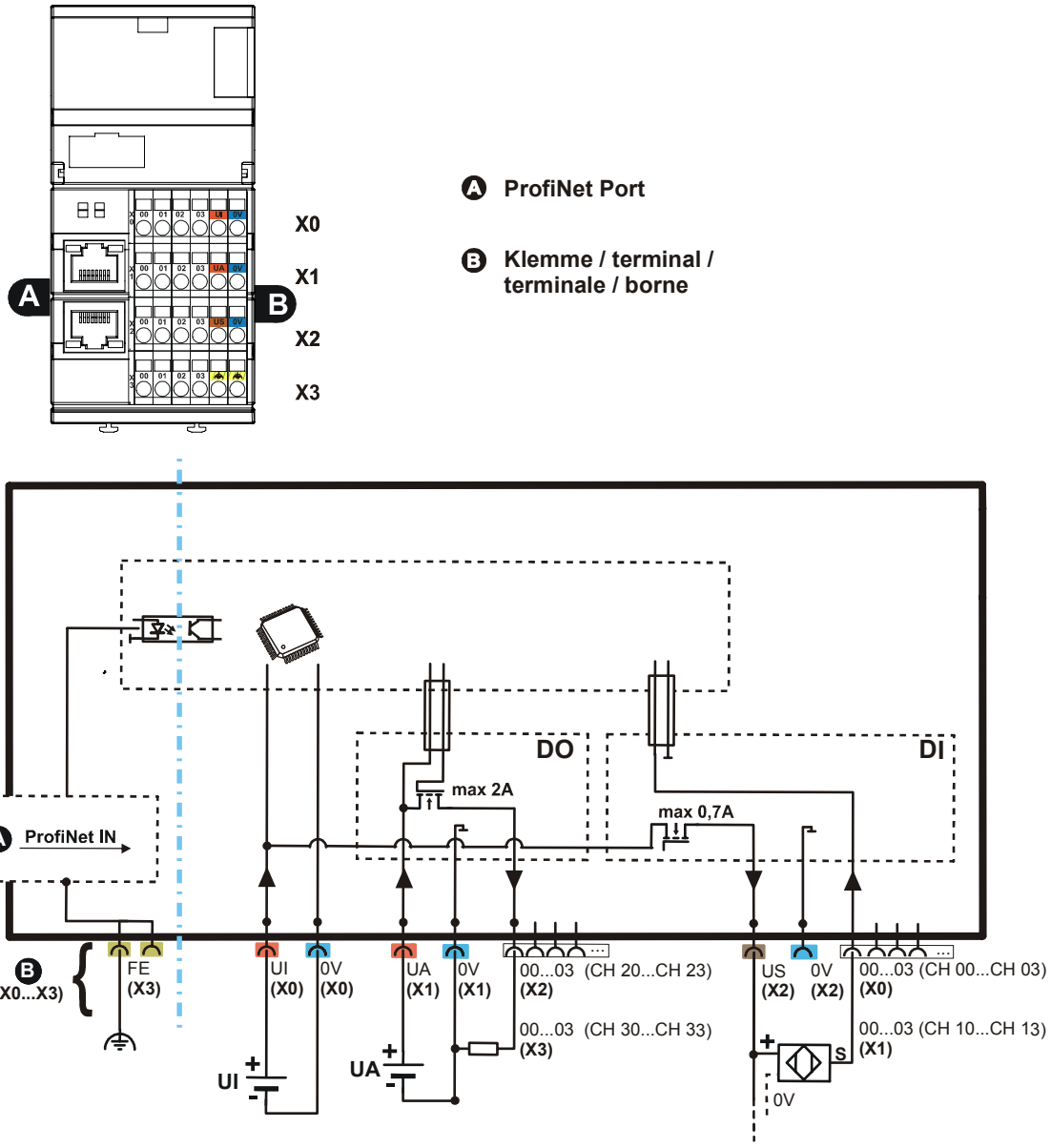


Fig. 9: Terminal Overview of Impact20 DI8DO8 Modules

3.2.2.3 DO16 Modules

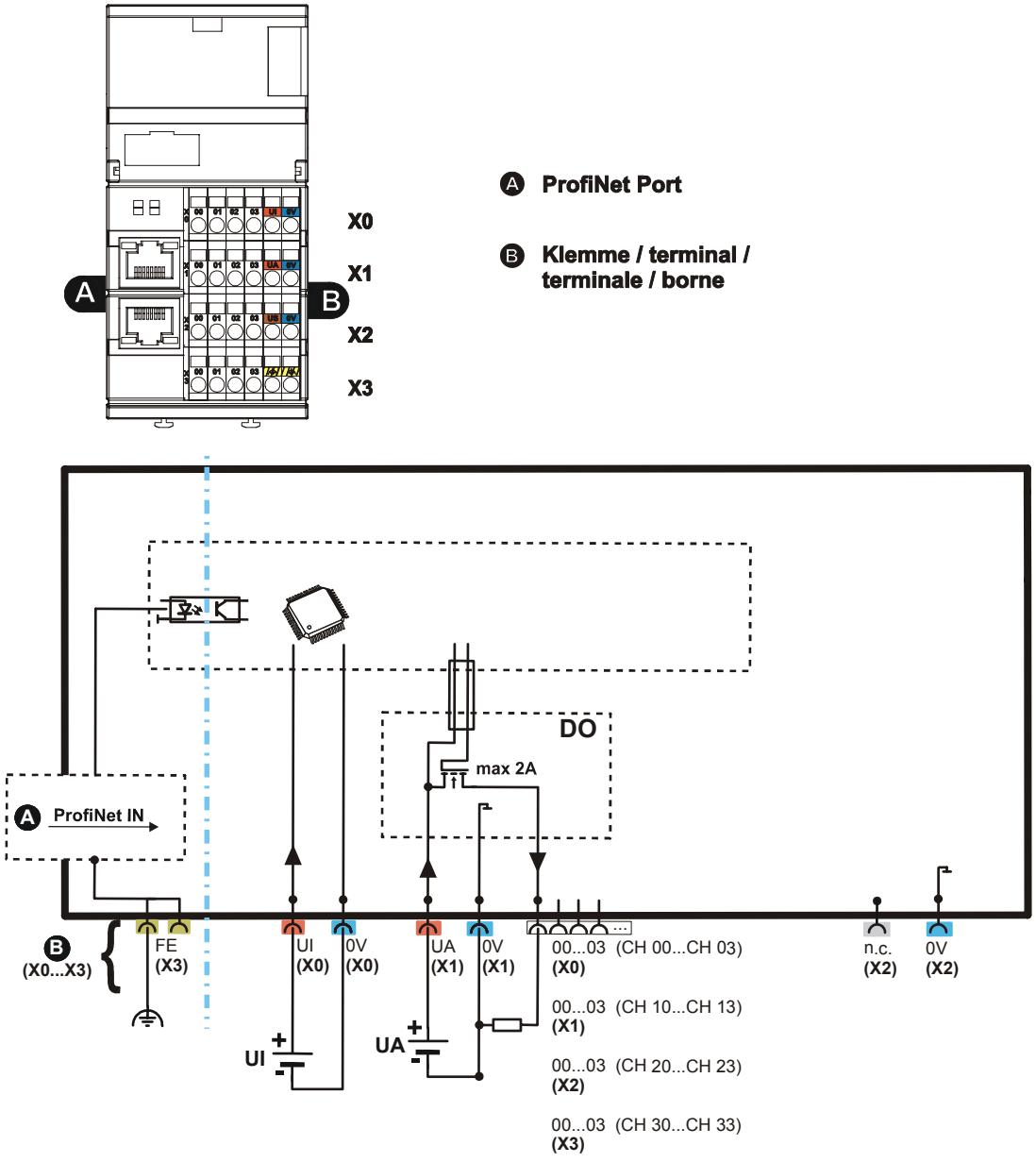


Fig. 10: Terminal Overview of Impact20 DO16 Modules

Murrelektronik offers label sheet Art. No. 56113 to label the terminals. Please refer to our Catalog.

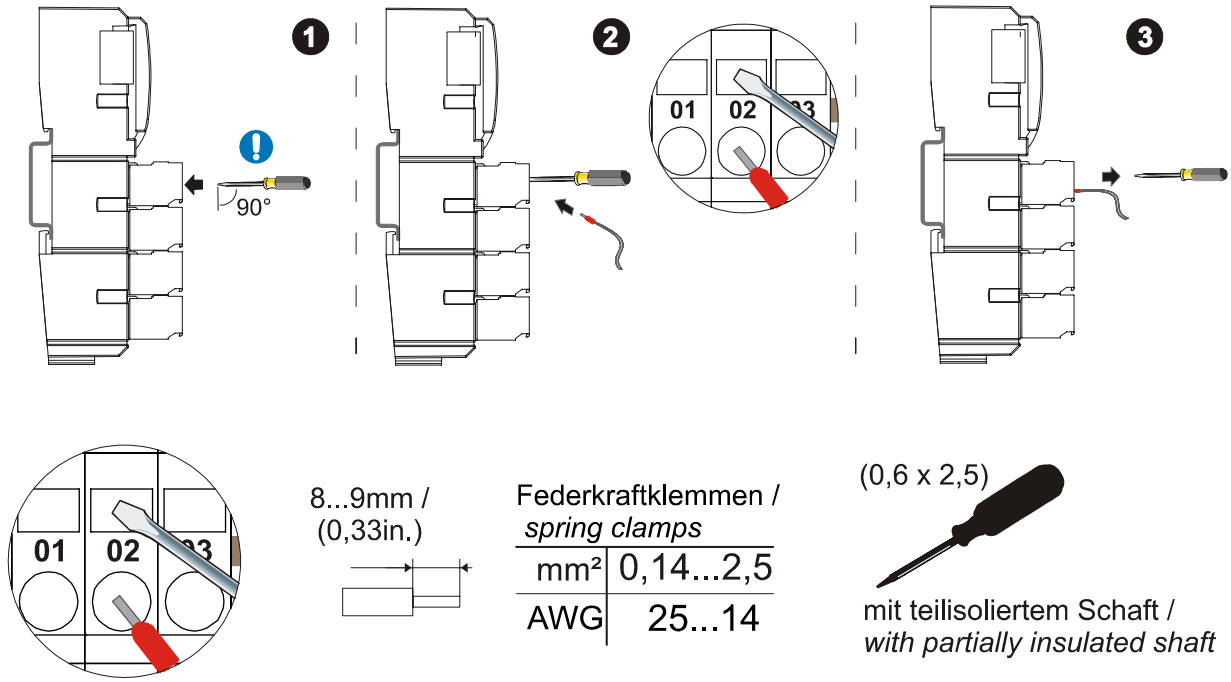


Fig. 11: Wiring Terminals

3.2.2.4 Removing terminals

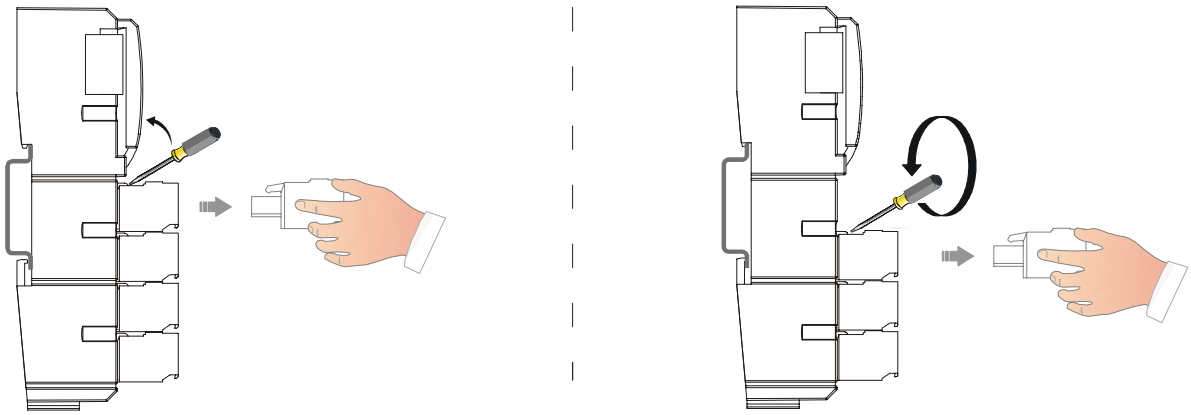


Fig. 12: Removing terminals

3.3 Installing the PROFINET IO

Impact20 modules can be integrated as a star or linear topology for the PROFINET IO network.

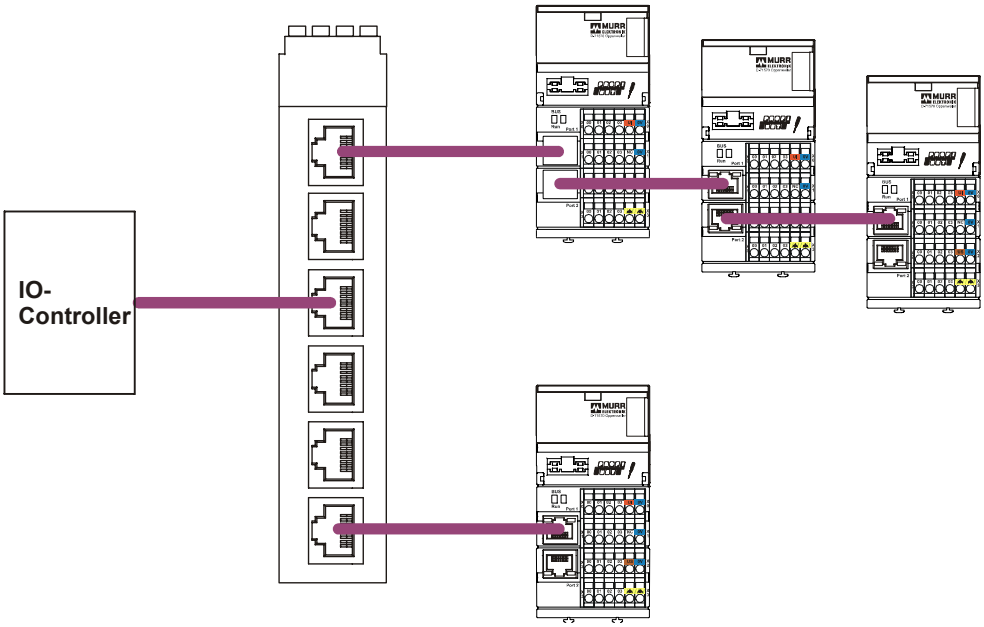


Fig. 13: PROFINET IO system installation in start topology

The Impact20 module contains two RJ45 female connectors for Ethernet / IP. One female connector supplies, the other drags on the PROFINET IO.

A maximum of 9 modules can be connected in series.

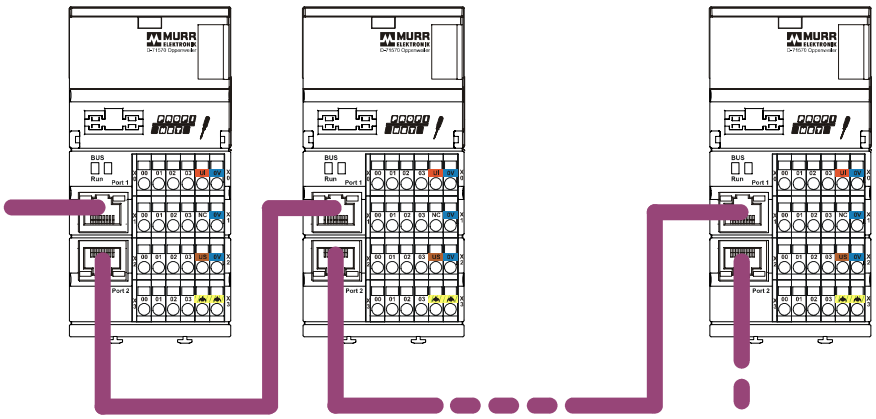


Fig. 14: PROFINET IO in bus topology

4 PROFINET Bus System

4.1 Startup

Configure your controller as described below using the example of a Siemens S7 controller.

Prior to setup, a competent system structure check of the field bus must be assured.

To conduct a startup, you require the latest IMPACT20 DDB file in GSDML format.

4.1.1 GSD File

The GDS file in GSDML format is required to operate the devices described in this manual.

GSDML-Vx.x-Murrelektronik-IMPACT20-JJJJMMTT.xml

Import the GSD file to the appropriate configuration tool before starting up the device.

The DDB file is downloadable as ZIP file from the Murrelektronik website on the page "Service → Technical Data" together with the associated bitmap file: www.murrelektronik.com

4.1.2 Configuration using the Simatic S7 Hardware Manager

This chapter explains how to configure and parameterize an IMPACT67 module using the example of the HW configuration (hardware configuration software of the Simatic S7

Manager).

4.1.2.1 General Information

Configuring a ProfiNet I/O device is necessary to define the I/O data quantity and reserve the addresses in the controller.

The IMPACT20 module is a physically compact device. However, in the PROFINET IO system, it is treated as a modular system. This modular system comprises a "virtual" head module to which "virtual" useful data and "virtual" diagnostic modules are connected.

Head Module

First, add the head module to the virtual bus, just as in a construction kit. Head modules always have zero data length and their function acts as module identification and parameterization. They are directly linked to the Article Number and the device name of each IMPACT20 module required for PROFINET IO.

Power Supply Module

A power supply module automatically follows each head module in Slot 1. The head module sends diagnostic messages to the power supplies.

Useful Data Modules

Then the useful data modules are connected in series automatically. A separate address can be assigned to each of the useful data modules in the PLC process image.

4.1.2.2 Projecting IMPACT20

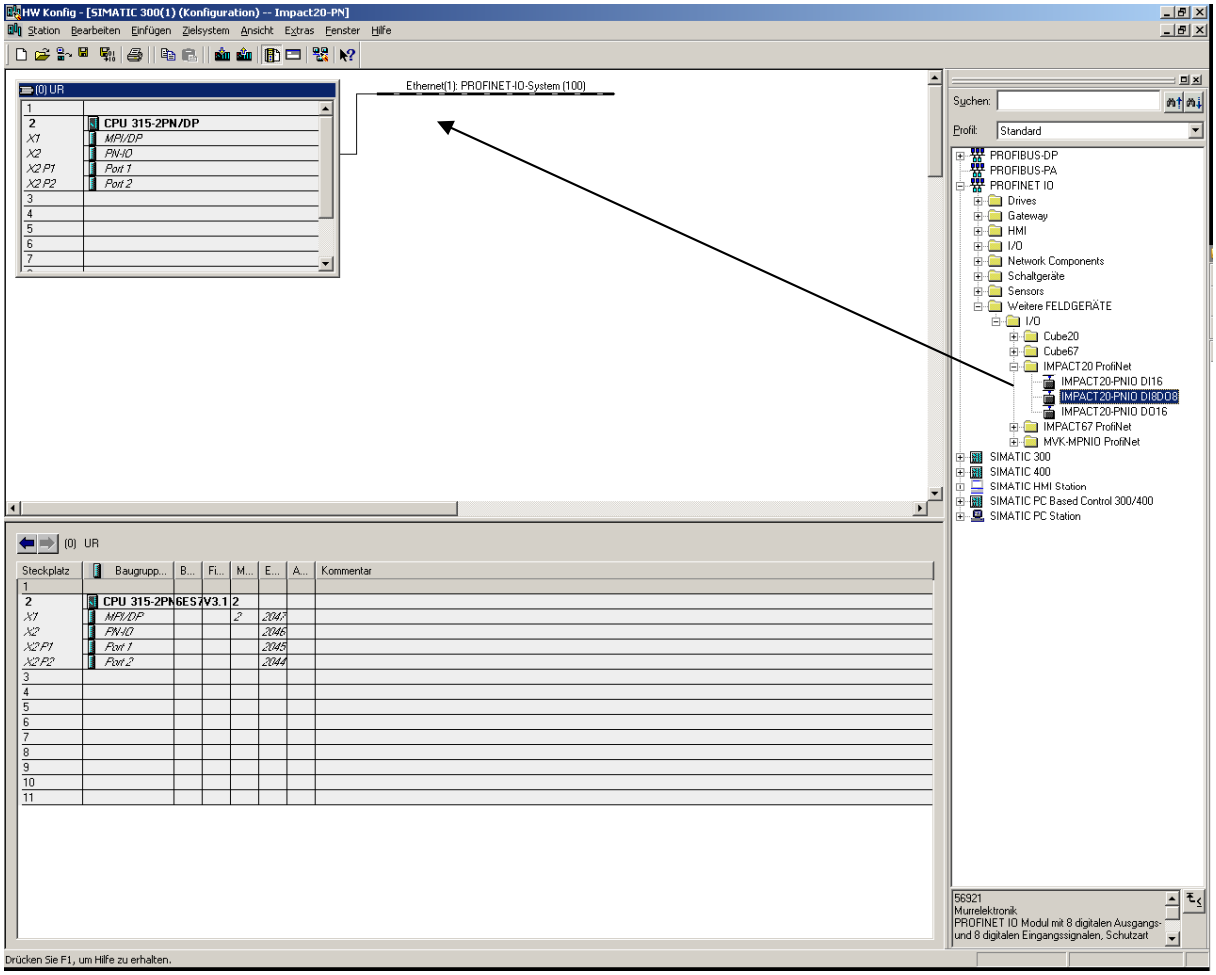


Fig. 15: Dragging "IMPACT20" onto the virtual PROFINET line

You can find the IMPACT20 modules under **PROFINET IO** → "***Other Field Devices***" → "***I/O***" in the Hardware Catalog.

Mark the appropriate "***IMPACT20 module***" in the Hardware Catalog and drag and drop the entry to the virtual PROFINET line.

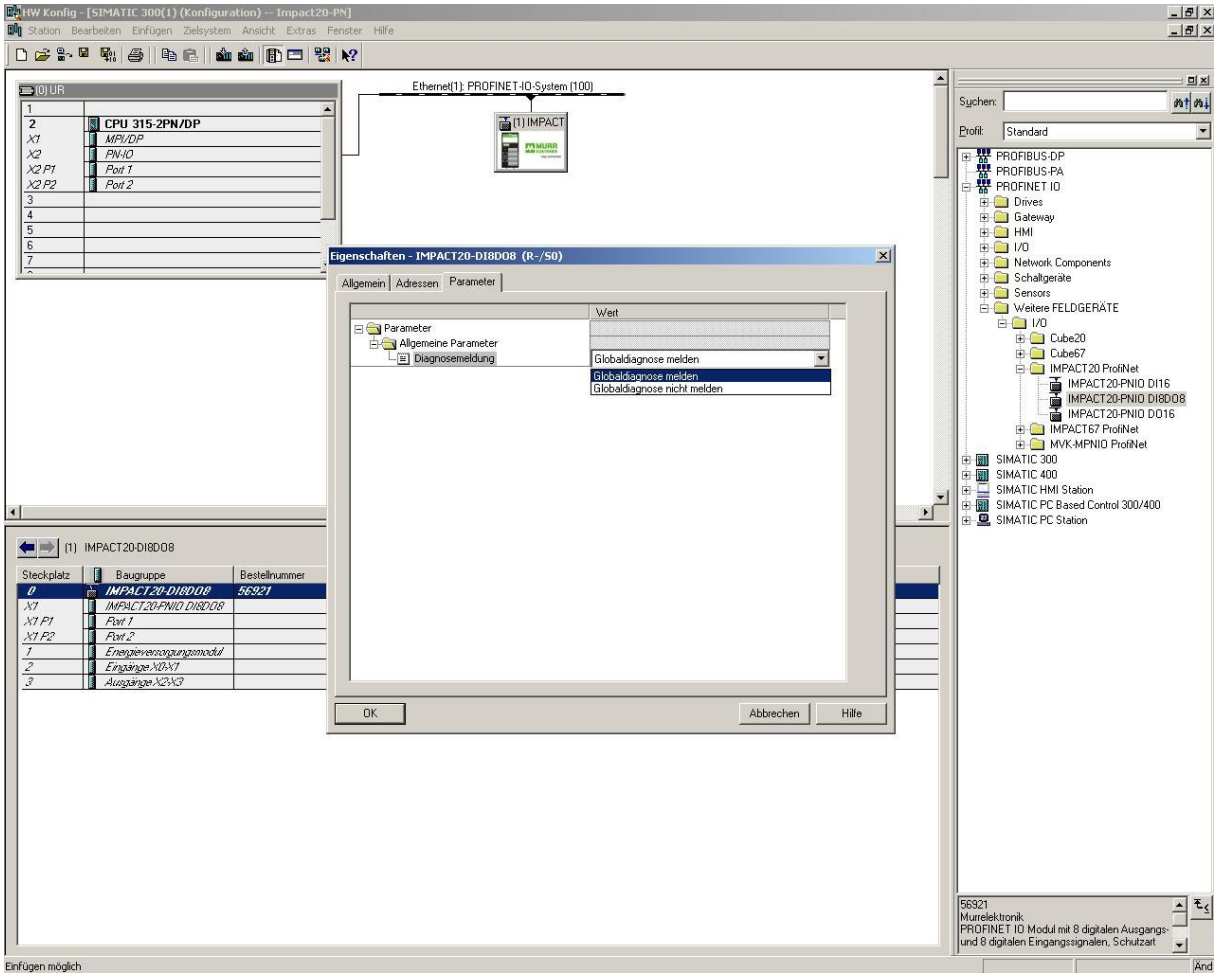


Fig. 16: Parameterizing using the virtual head module in Slot 0

After adding the required IMPACT20 module into the PROFINET IO system, you can parameterize it in Slot 0 using the virtual head module.

Double-click to open the dialog for module properties. Click on the "Parameters" tab and parameterize the module. For a detailed explanation of the meaning of these parameters, refer to Chapter 4.1.3 Parameterization.

4.1.2.3 Setting the Topology

PROFINET IO offers a number of functions, diagnostic, and maintenance options based on the existing topology or utilizing knowledge of the topology. All IMPACT20 modules support the topology setting and automatic topology recognition by the Engineering Tool.

This section briefly explains how to set up the topology for IMPACT20 modules.

Setting the module using the connected adjacent devices is carried out using Slots X1 P1 and X1 P2. They represent the physical interfaces.

A list of possible ports of other devices in the project are located on the Topology tab under the "Partner Port" option.

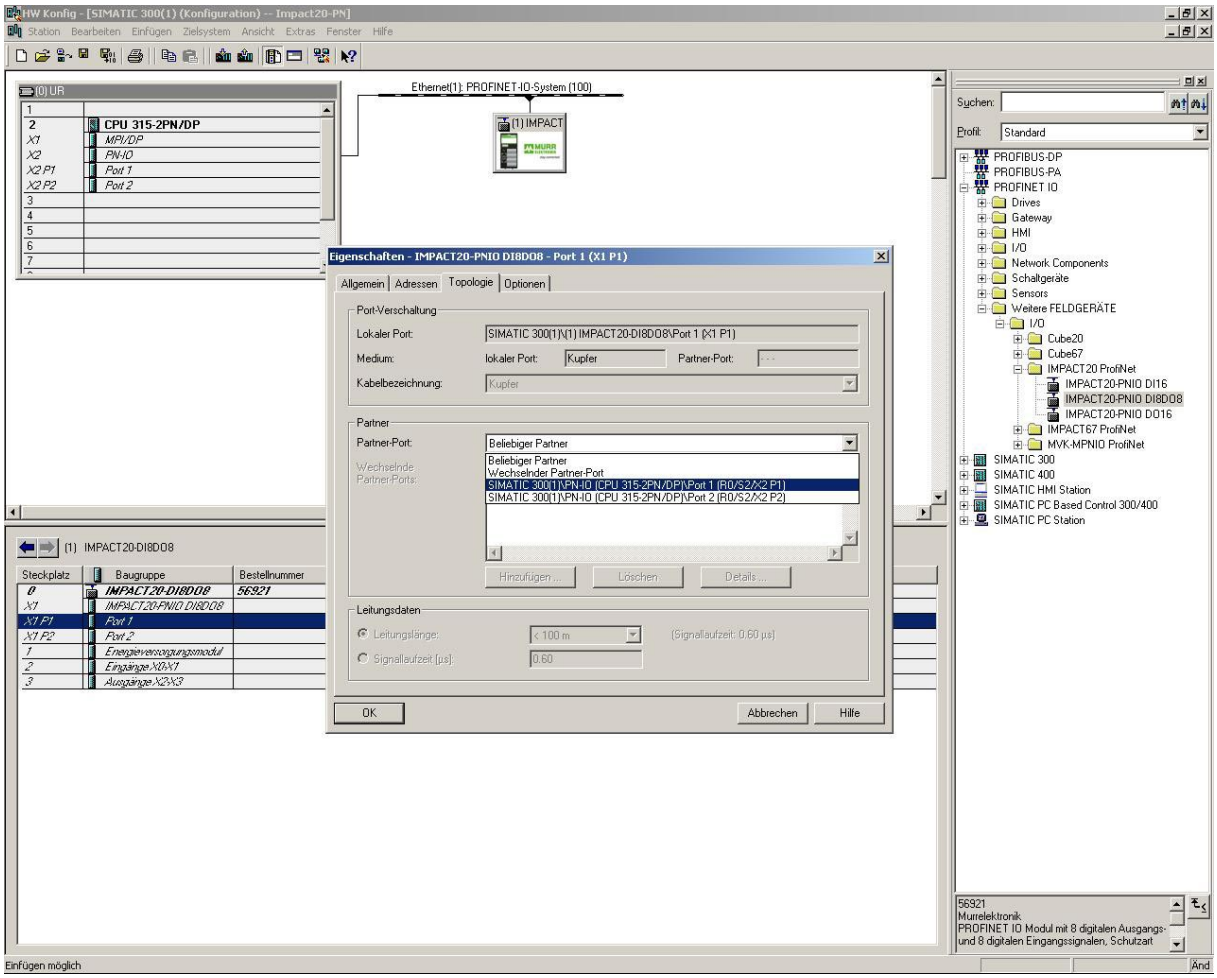
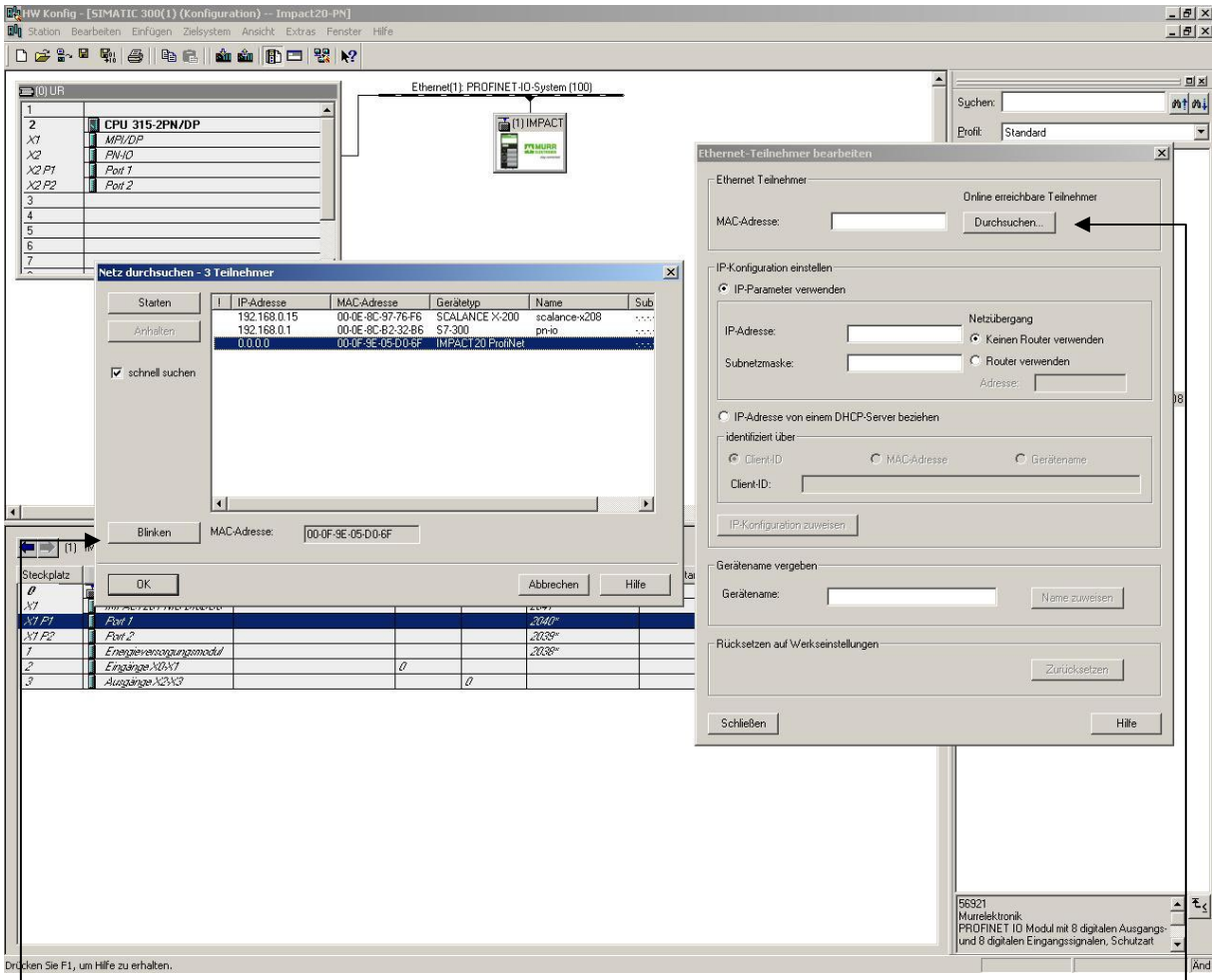


Fig. 17: Setting the topology for IMPACT20 modules

4.1.2.4 Identifying Individual Devices in the Network

The PROFINET IO devices are identified by using their MAC address and the device type in each case. If you have want to put several modules of the same type into operation, you must assign them different symbolic device names.



Use your configuration tool to scan and select all the modules in the network. Use the path below to search the network for reachable users in the HW configuration: **Target system → Ethernet → Edit Ethernet Users → Search**

Identification takes place using the blink test. This test makes the identification LED of the selected IMPACT20 device blink at a rate of 2 Hz. Mark an available device and select the **Blink** option.

Fig. 18: Identifying devices in the network

The IMPACT20 has the following factory settings:

- MAC address: 00-0F-9E-xx-xx-xx

- IP address: 0.0.0.0

- Device type: IMPACT20 PROFINET

- Device name: (empty)

4.1.2.5 Issuing Device Names and IP Addresses

After you identify a module unambiguously, assign a device name to it. The IP address is issued automatically by the PROFINET Controller using DCP (Discovery and Configuration Protocol).

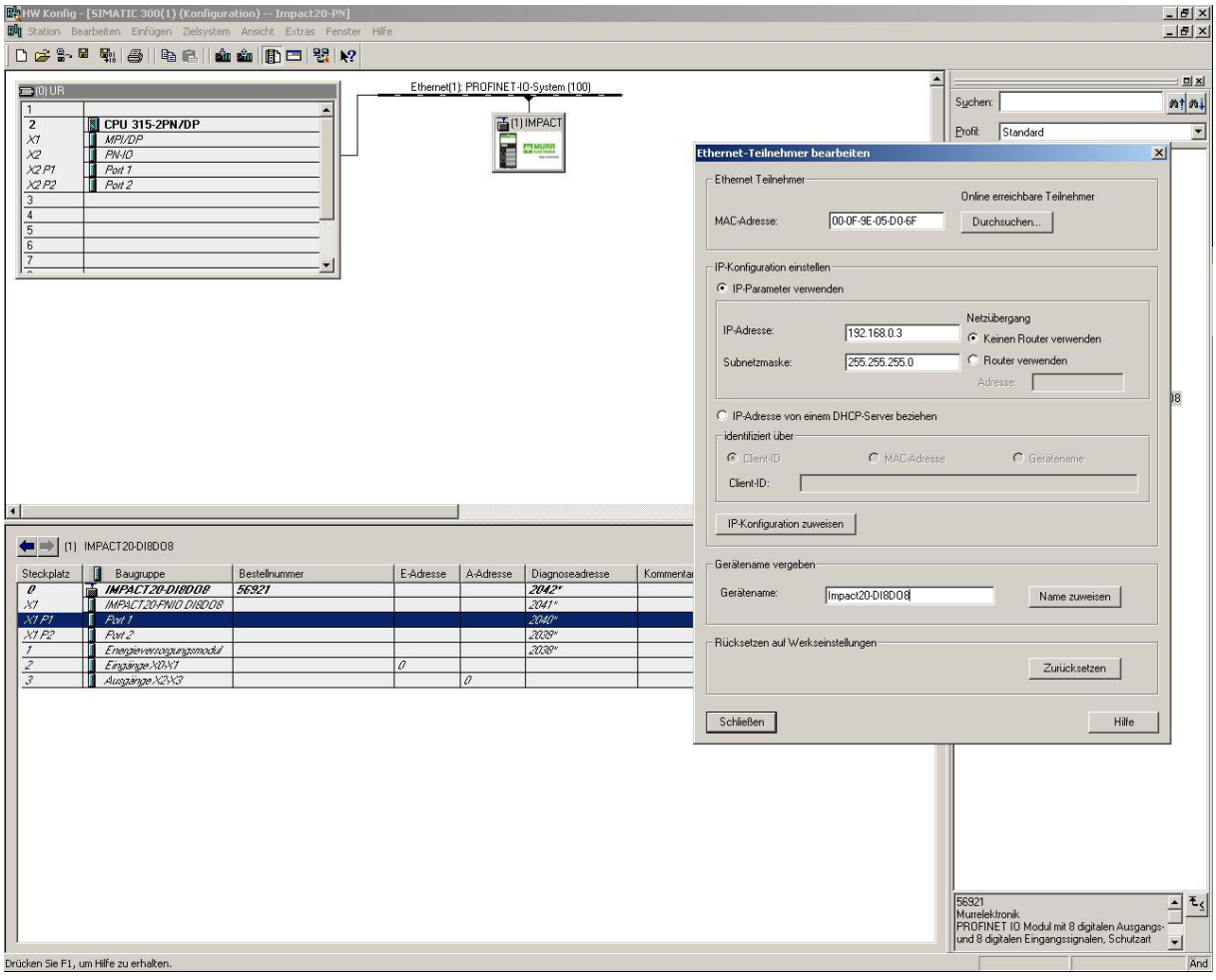


Fig. 19: Issuing device names and IP addresses

The Simatic S7 Manager then shows you the data detected from the IMPACT20. With PROFINET IO, it is absolutely necessary to award a unique symbolic name for each device.

The address and name resolution is only regulated using the name that is stored in a nonvolatile memory. After entering a name, click on "***Assign Name"***.

You can issue the Impact20 module with an IP address that can be saved in a nonvolatile memory in the module. Then enter the required IP address and the subnet mask to be uses. Finally click on "***Assign IP Configuration***". Alternatively, if you want to select the IP address automatically by DHCP Server, mark the suboption accordingly.

The "Reset to Factory Settings" function clears the previous settings and restores the defaults.

IP address: 0.0.0.0

Device name: (empty)

4.1.3 Parameterization

This chapter explains the parameterization options.

	Parameters	**Description**
1	Signal / do not signal global diagnostics	Activates / deactivates all module diagnostics.

Table 2: Parameters

4.1.4 Saving and Translating

When you have configured all the modules, you can save and translate the configuration. After transmitting the application to the controller, the configuration and parameterization are completed.

4.2 Mapping I/O Data

4.2.1 Byte Distribution

Header Modules	Number of output bytes	Number of input bytes
IMPACT20 PN DI16, 56920	0	2 bytes
IMPACT20 PN DI8/DO8, 56921	1 byte	1 byte
IMPACT20 PN DO16, 56922	2 bytes	0

Table 3: Byte distribution

4.2.2 Correlation Between Terminal and Channel ID

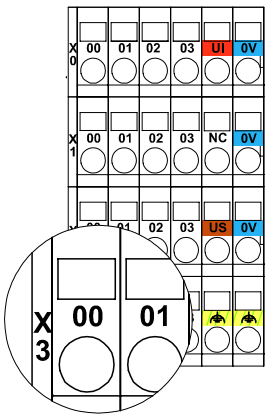


Fig. 20: Example of channel ID

Channel ID

1st digit = terminal row

2nd digit = terminal

Example

Terminal row X3 + terminal 00 = channel 30

Terminal row X3 + terminal 01 = channel 31

4.2.2.1 Overview of Channel Bit Assignment

Row	16 DI			
X0	00 (DI)	01 (DI)	02 (DI)	03 (DI)
	KN 00	KN 01	KN 02	KN 03
	Output bit X.0	Output bit X.1	Output bit X.2	Output bit X.3
X1	00 (DI)	01 (DI)	02 (DI)	03 (DI)
	KN 10	KN 11	KN 12	KN 13
	Output bit X.4	Output bit X.5	Output bit X.6	Output bit X.7
X2	00 (DI)	01 (DI)	02 (DI)	03 (DI)
	KN 20	KN 21	KN 22	KN 23
	Output bit X+1.0	Output bit X+1.1	Output bit X+1.2	Output bit X+1.3
X3	00 (DI)	01 (DI)	02 (DI)	03 (DI)
	KN 30	KN 31	KN 32	KN 33
	Output bit X+1.4	Output bit X+1.5	Output bit X+1.6	Output bit X+1.7
	24 V / current as per input characteristic Type 3			

Table 4: Channel assignment for DI modules

Row	16 DO			
X0	00 (DO)	01 (DO)	02 (DO)	03 (DO)
	KN 00	KN 01	KN 02	KN 03
	Output bit X.0	Output bit X.1	Output bit X.2	Output bit X.3
X1	00 (DO)	01 (DO)	02 (DO)	03 (DO)
	KN 10	KN 11	KN 12	KN 13
	Output bit X.4	Output bit X.5	Output bit X.6	Output bit X.7
X2	00 (DO)	01 (DO)	02 (DO)	03 (DO)
	KN 20	KN 21	KN 22	KN 23
	Output bit X+1.0	Output bit X+1.1	Output bit X+1.2	Output bit X+1.3
X3	00 (DO)	01 (DO)	02 (DO)	03 (DO)
	KN 30	KN 31	KN 32	KN 33
	Output bit X+1.4	Output bit X+1.5	Output bit X+1.6	Output bit X+1.7
	24 V / max. 2			

Table 5: Channel assignment for DO modules

Row	DI8 / DO8			
X0	00 (DI)	01 (DI)	02 (DI)	03 (DI)
	KN 00	KN 01	KN 02	KN 03
	Input bit X.0	Input bit X.1	Input bit X.2	Input bit X.3
X1	00 (DI)	01 (DI)	02 (DI)	03 (DI)
	KN 10	KN 11	KN 12	KN 13
	Input bit X.4	Input bit X.5	Input bit X.6	Input bit X.7
X2	00 (DO)	01 (DO)	02 (DO)	03 (DO)
	KN 20	KN 21	KN 22	KN 23
	Output bit X.0	Output bit X.1	Output bit X.2	Output bit X.3
X3	00 (DO)	01 (DO)	02 (DO)	03 (DO)
	KN 30	KN 31	KN 32	KN 33
	Output bit X.4	Output bit X.5	Output bit X.6	Output bit X.7
	DI: 24 V / current as per input characteristic Type 3 DO: 24 V / max. 2			

Table 6: Channel assignment for DIDO modules

5 Diagnostics and LED DIsplays

All IMPACT20 modules have separate and well arranged LEDs for device and I/O status. These displays are located on the front of the device.

The following diagnostics are displayed visually and signaled over the fieldbus:

- Sensor short-circuit as group signal
- Actuator short-circuit by channel and group signal
- Undervoltage module power supply UI (module power supply <18V)
- Undervoltage actuator power supply UA (actuator power supply < 18V)

5.1 Function of Bus Status LEDs

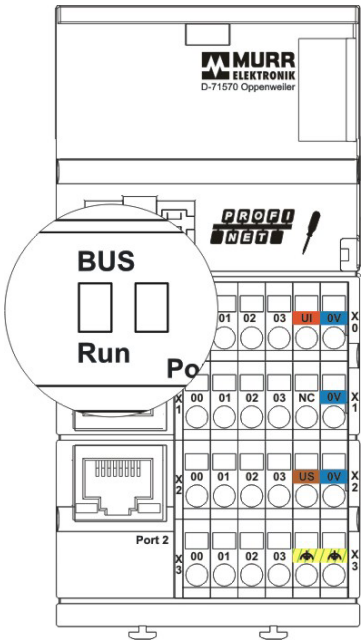


Fig. 21: PROFINET module: Bus LEDs

5.1.1.1 Signal States of Bus Status LEDs

LED Designation	LED Display	Response	Meaning
Bus Run		off	Power supply <12V
		green	Connection to I/O controller
		flashing green	No connection to I/O controller (timeout, bus connection interruption, general physical bus error)

Table 7: Bus status LEDs on module front panel

5.2 Module and Actuator Power Supplies

An LED is provided for each of the module power supply terminals "UI" and actuator power supply terminals "UA".

- The LEDs under "**UI“** show the status of the module and sensor power supplies.
- The LEDs under "**UA“** show the status of the digital outputs.

5.2.1 Threshold Values of the Module Power Supply UI

There are two thresholds for undervoltage detection:

12 V < UI < 18 V — The device continues to function but
- The UI LED lights up red.
- The associated diagnostic was transferred to the Master.

>12V — The device performs a power reset.
All outputs are reset to 0.

5.2.2 Threshold Values of the Power Supply UA

There is one threshold for undervoltage detection:

UA < 18 V : — The device continues to function but
- The UA LED lights up red.
- The associated diagnostic was transferred to the Master.

5.2.3 LED Displays UI and UA

LED Displays UI and UA	Response	State
	green	Power supply OK (≥ 18 V)
	red	Undervoltage (< 18 V)
	off	Voltage ≤ approx. 12 V

Table 8: LED module power supply

Please note that the sensor power supply voltage (US terminal) is connected internally to the module power supply voltage (UI terminal). This ensures that the two terminals have the same voltage.

5.3 Signal-Logic Display and LED Response

A separate status display is assigned to every channel. This is labeled **"00 to 03"**. A detailed overview of the channels is provided in Tables 4 to 6 in Section 4.2.2.1. They are located below the associated terminal and assign the status to the peripheral components.

5.3.1 Correlation Between Signal-Logic Display and LED Response at Input

LED Display		Logic Value	Voltage at Input	Signal
	off	0	< 11 V	Input with NO contact function
	Yellow	1	11 to 30.2 V (dependent on US)	

Table 9: LED at input of digital modules

5.3.2 Correlation Between Signal-Logic Display and LED Response at Output

LED Display		Logic Value	Voltage at output	Signal
	off	0	0 V	Output
	Yellow	1	12 to 30.2 V (dependent on UA)	

Table 10: LED at output of digital modules

5.4 Short-Circuit or Overload of Sensor Power Supply US

Response of IMPACT20 modules to short-circuit or overload of sensor power supply:

- The bus transmits diagnostic data to the Master.
  After rectification of the overload or short-circuit, the sensor power supply is immediately available again.
- The diagnostic LED on the associated terminal lights up red.
- The LEDs under **"US"** indicate the status of the sensor power supply voltage.

LED Display US	Response	State
	off	Power supply OK
	red	Overload or short-circuit of sensor power supply.

Table 11: LED periphery power supply

5.5 Short-Circuit or Overload of Actuators

Response of IMPACT20 modules to short-circuit or overload of outputs:

- The bus transmits diagnostic data to the Master.
  After rectifying the overload of short-circuit, the output is only available after UA switchoff or channel reset.
- The diagnostic LED at the associated terminal lights up red.

LED Display	Response	State
	Off / yellow	Output with no overload / short-circuit
	red	Output in overload / short-circuit case

Table 12: LED at output of digital modules

6 Technical Data

6.1 PROFINET IP20 Module

	IMPACT20 P DI16 Art. No.: 56920	IMPACT20 P DI8 DO8 Art. No.: 56921	IMPACT20 P DO16 Art. No.: 56922
General			
Terminals X0 and X1	16 inputs	8 inputs	16 outputs
Terminals X2 and X3		8 outputs	
EMC			
EN 61131-2	Product standard		
EN 61000-4-2 ESD	Contact ± 4 kV, air ± 8 kV		
EN 61000-4-3 RF-Field & GSM	10 V/m		
EN 61000-4-4 Burst	± 2 kV DC inputs, ± 1 kV signal lines Asym./sym. ± 500 V		
EN 61000-4-5 Surge	Asym. ± 1 kV		
EN 61000-4-6 HF-asymmetric	10 V		
EN 61000-4-8 Magnetic field 50 Hz	30 A/m		
EN 55011 Emission	QP 40 dBµV/m (30 … 230 MHz) QP 47 dBµV/m (230 … 1000 MHz) Class B		
Ambient Conditions			
Operating temperature	0°C ... +55 °C		
Storage temperature	-20°C ... +70 °C		
Enclosure type according to EN 60529	IP 20		
Mechanical Ambient Conditions			
Oscillation according to EN 60068 Part 2-6	5 … 60 Hz: constant amplitude 0,35 mm; 60 … 150 Hz: constant acceleration 5 g		
Shock according to EN 60068 Part 2-27	Amplitude 15 g, 11 ms duration		
Miscellaneous			
Dimensions (LxWxH)	117 x 56 x 47 mm		
Mounting dimension (L xW)	117 x 56 mm		
Weight	Approx. 170 g		

	IMPACT20 P DI16 Art. No.: 56920	IMPACT20 P DI8 DO8 Art. No.: 56921	IMPACT20 P DO16 Art. No.: 56922
Bus Data			
Transfer protocol	ProfiNet		
Transfer rate	100 MBit/s		
Addressing	Via DCP		
Cycle time	2 ms		
Connection Possibilities			
Sensor and actuator supply	Cage clamp 2.5 mm²		
Bus connection	2 x RJ45		
Sensor	4 x 4 terminal block connectors	2 x 4 terminal block connectors	-
Outputs	-	2 x 4 terminal block connectors	4 x 4 terminal block connectors
Maximum length of output cable	-	with 0.75 mm² max. 10 m, with 0.34 mm² max. 5 m	
Maximum length of input cable	< 30 m		-
Power Supply			
Operating voltage range logic UI	18 … 30.2 V DC		
Current consumption (only, UI)	120 mA		
Actuator supply UA power over cage clamp connection	max. 12 A		
Reverse voltage protection module electronics	Yes		
Reverse voltage protection actuator supply	-	Yes	
Reverse voltage protection sensor supply US	Yes		-
Overvoltage protection	Yes (suppressor diode)		

	IMPACT20 P DI16 Art. No.: 56920	IMPACT20 P DI8 DO8 Art. No.: 56921	IMPACT20 P DO16 Art. No.: 56922
Inputs			
Number of inputs	16	8	-
Delay time for signal change	2 ms		-
Input characteristics	EN 61131-2, Type 3		-
Outputs			
Number of outputs	-	8	16
Switching frequency	-	approx. 50 Hz, 50% duty ratio	
Actuator current load	-	approx. 2 A per actuator	approx. 0,5 A per actuator
Switching frequency inductive load	-	approx. 10 Hz	
Lamp load	-	max. 40 W	
Sensor power supply US			
Max. current	0.7 A		-
Short circuit protection for sensors with automatic restart	Yes		-
Reverse polarity protection	Yes		-

Table 13: Technical Data

6.1.1 Dimensioning

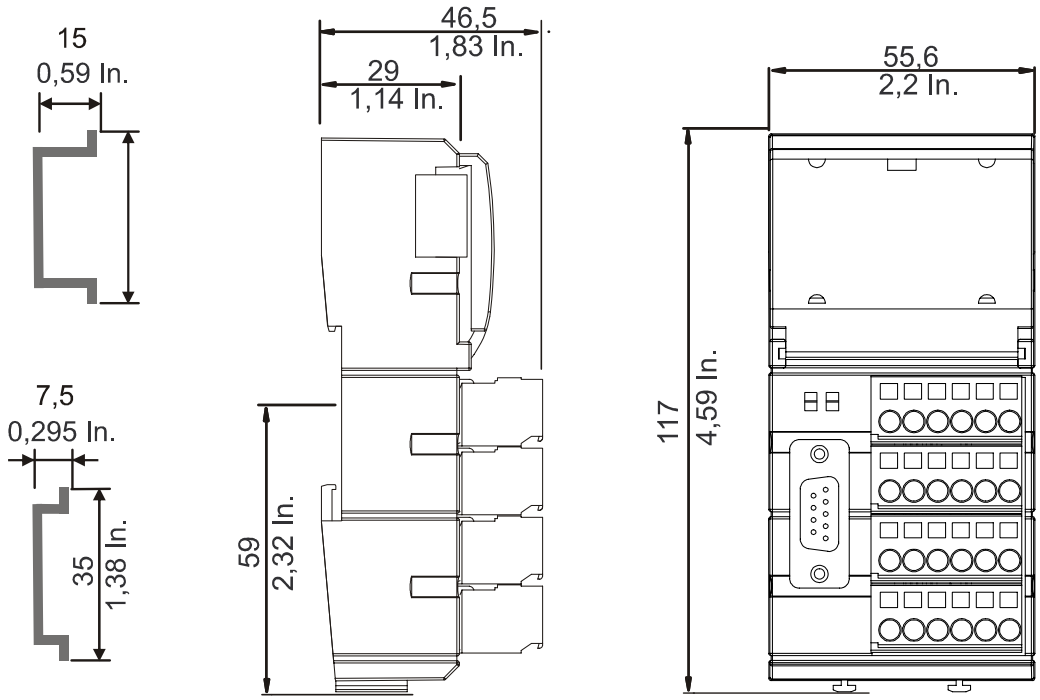


Fig. 22: Dimensioning

Fig. 23:

The dimensions of all IMPACT20 modules are identical.

7 Accessories

7.1 Label Sheets

Article Number	Description
56113	Label Sheets

Table 14: Accessories, Label Sheets

7.2 Coding Elements for Terminals

Article Number	Description
56115	Coding elements for terminals

Table 15: Accessories, Coding Elements for Terminals

7.3 Blind Plugs RJ45

Article Number	Description
58150	Blind plugs RJ45

Table 16: Accessories, blind plugs

7.4 Fieldbus Cables

Article Number	Description
7000-00000-8409999	Bus cable for ProfiNet, 100 m collar
7000-99711-7960060	Bus cable RJ45 – RJ45, straight 0.6 m
7000-99711-7960100	Bus cable RJ45 – RJ45, straight 1.0 m
7000-99711-7960150	Bus cable RJ45 – RJ45, straight 1.5 m
7000-99711-7960300	Bus cable RJ45 – RJ45, straight 3.0 m

Table 17: Fieldbus cables

7.5 Fieldbus Connectors

Article Number	Description
7000-99051-0000000	RJ45 Ethernet connector, straight shielded, 4-pin, IP20 self-connecting

Table 18: Fieldbus connectors

7.6 Fieldbus System Components

Article Number	Description	
58154	TREE 4TX	Unmanaged 4 Port Switch
58158	TREE 8TX	Unmanaged 8 Port Switch

Table 19: Fieldbus system components

7.7 I/O Cable

Murrelektronik offers a wide range of actuator and sensor products. This ranges from connectors, cables, and adapters through to special-purpose requirements.

Refer to our catalog or visit our inline shop at

www.murrelektronik.com.

7.8 Recommended Power Supply Units

Primary switched-mode power supply units from Murrelektronik are specially designed to power automation systems. For this reason, we recommend this system type to power modules.

Phases	Output power	Input voltage 95 to 132 VAC	Input voltage 185 to 265 VAC
1	240 W / 10 A	85086	85085
1	480 W / 20 A	85088	85087

Table 20: Recommended power supply units, MCS power+ single-phase

Phases	Output power	Input voltage 3 x 340 to 460 VAC
3	240 W / 10 A	85095
3	480 W / 20 A	85097
3	960 W / 40 A	85099

Table 21: Recommended Power Supply Units, MCSPower+ Three-Phase

Table 22:

Murrelektronik offers a comprehensive selection of primary switched-mode power supply units. Refer to our catalog or visit our inline shop at ***www.murrelektronik.com***.

7.9 MICO

MICO monitors currents

You can select a maximum individual current value for each channel and MICO monitors this value.

LED = green

MICO indicates when approaching the maximum load

There is a visual alarm when 90% of the selected current load is reached.

LED = green (flashing)

MICO detects over-stress

In case of short circuits or if the load current exceeds the selected value, MICO switches off the affected channel.

LED = red (flashing)

Article Number	Description	Current adjustment [A]	
9000-41034-0100400	MICO 4.4 (4 channels)	1, 2, 3, 4	
9000-41034-0100600	MICO 4.6 (4 channels)	1, 2, 4, 6	
9000-41034-0401000	MICO 4.10 (4 channels)	4, 6, 8, 10	
9000-41034-0101000	MICO 4.4.10 ACTUATOR-SENSOR (4 channels)	2 x 1, 2, 3, 4 2 x 4, 6, 8, 10	
9000-41034-0401005	MICO 4.10 SPEED-START (4 channels)	4, 6, 8, 10	
9000-41042-0100400	MICO 2.4 (2 channels)	1, 2, 3, 4	
9000-41042-0100600	MICO 2.6 (2 channels)	1, 2, 4, 6	
9000-41042-0401000	MICO 2.10 (2 channels)	4, 6, 8, 10	

Table 23: Overview of MICO variants

Murrelektronik offers a wide selection of products and accessories.
Refer to our catalog or visit our inline shop at
onlineshop.murrelektronik.com

7.10 Voltage Terminal Block

Article Number	Description
56078	Voltage terminal block gray / gray / brown / blue
56079	Voltage terminal block gray / gray / yellow / blue
56080	Voltage terminal block yellow / blue / yellow / blue
56081	Voltage terminal block brown / blue / brown / blue
56109	Voltage terminal block brown / brown / blue / blue
56110	Voltage terminal block blue / blue / yellow / yellow
56111	Voltage terminal block blue / yellow / brown / blue

Table 24: Voltage Terminal Block Accessories

7.10.1 Description

Voltage terminal blocks are small aids that assist in the simple bridging or chaining of a required level or voltage.

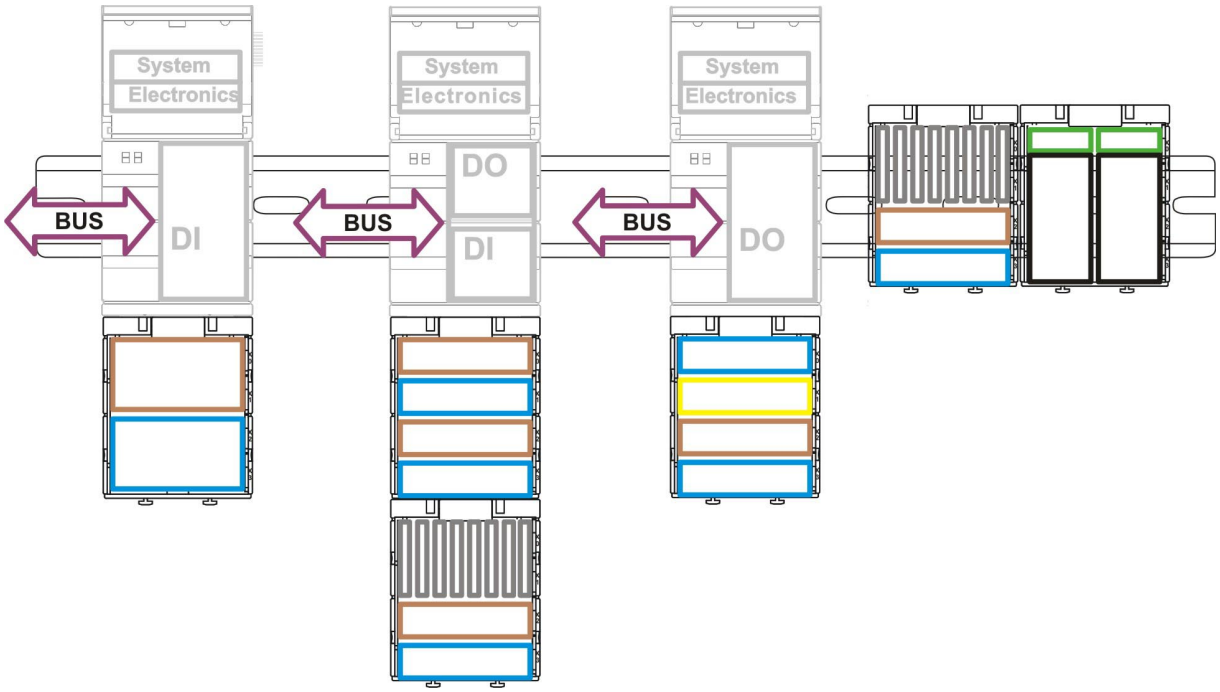


Fig. 24: Application information

7.10.2 Mounting Dimensions

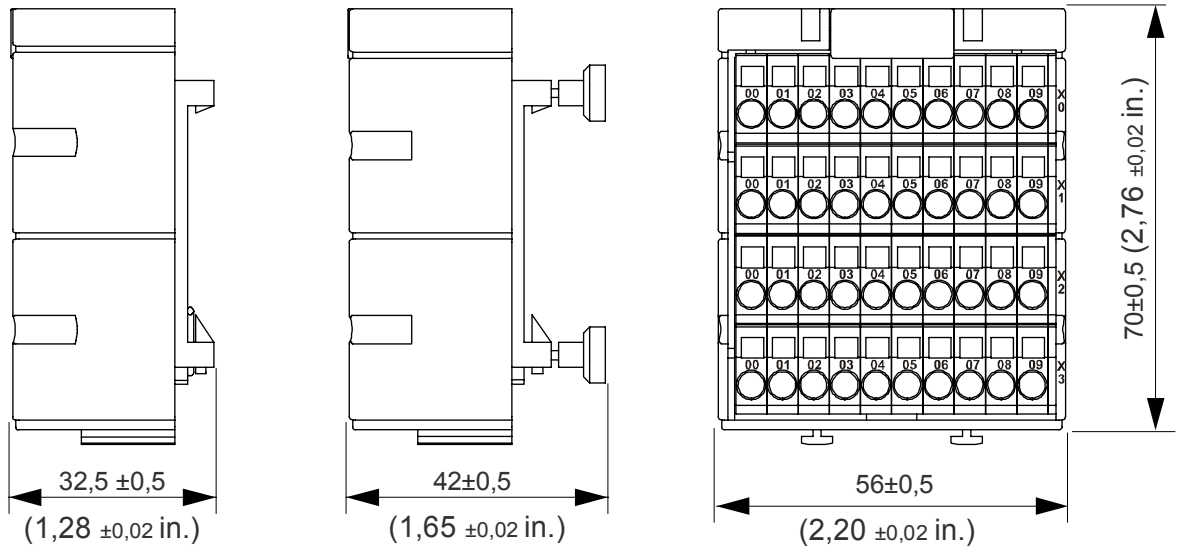


Fig. 25: Mounting Dimensions

7.10.3 Mounting Position/Distances

Einbaulage / Mounting position	beliebig / any
Abstand / Distance	beliebig / any

Table 25:

7.10.4 Mounting on DIN Mounting Rail and on Module

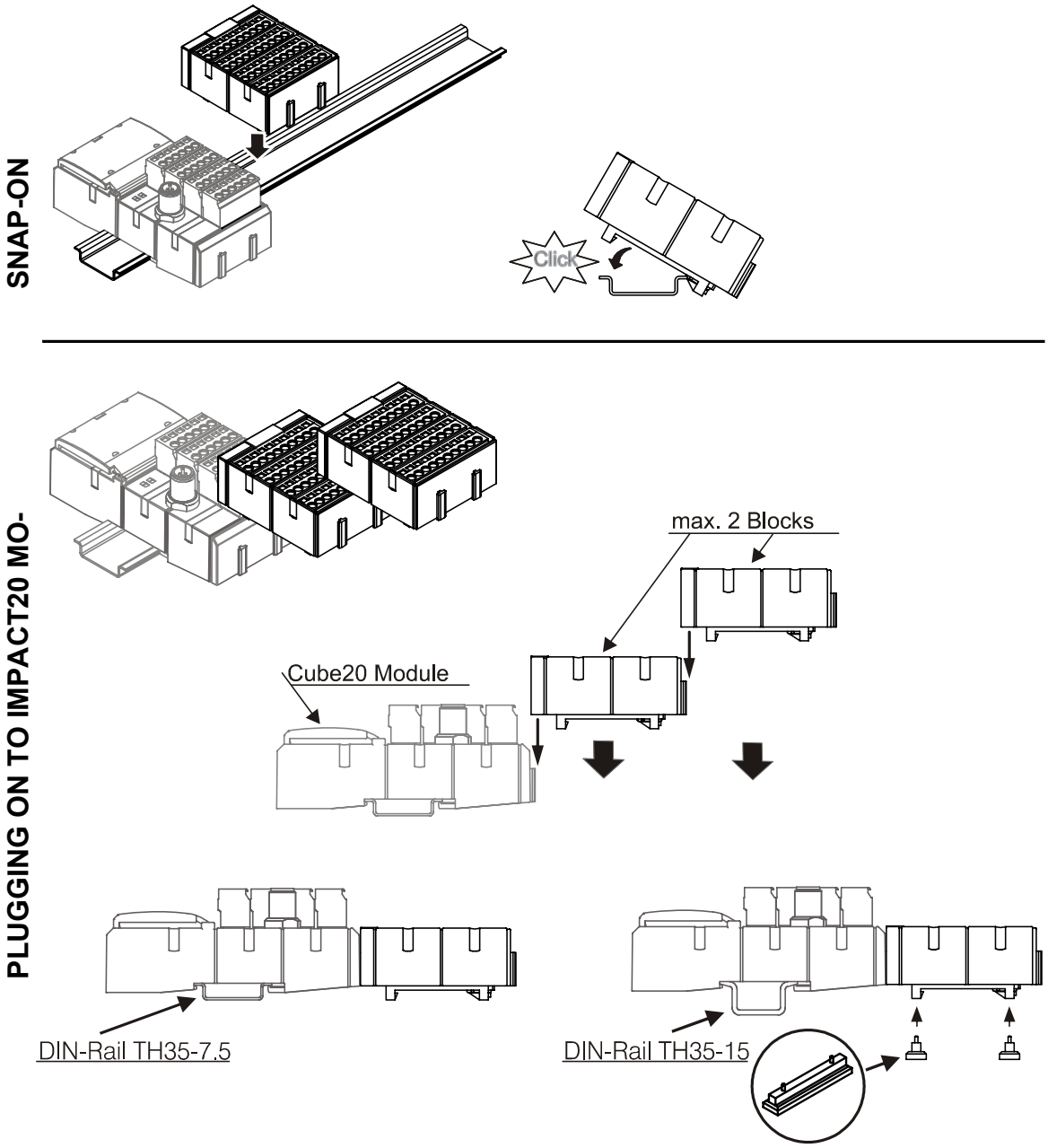
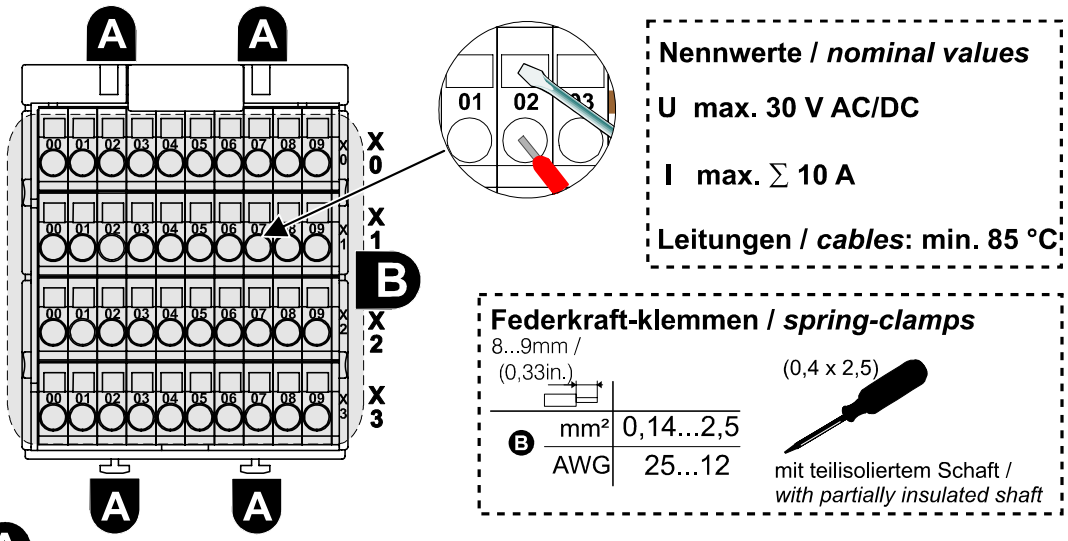


Fig. 26: Mounting the voltage terminal block on DIN mounting rails and on IMPACT20 module

7.10.5 Installation

7.10.5.1 Terminal Overview Art. Nos. 56078, 56079, 56080, 56081, 56084, 56109, 56110, 56111



A **Modulverbindung / *Module-connection***

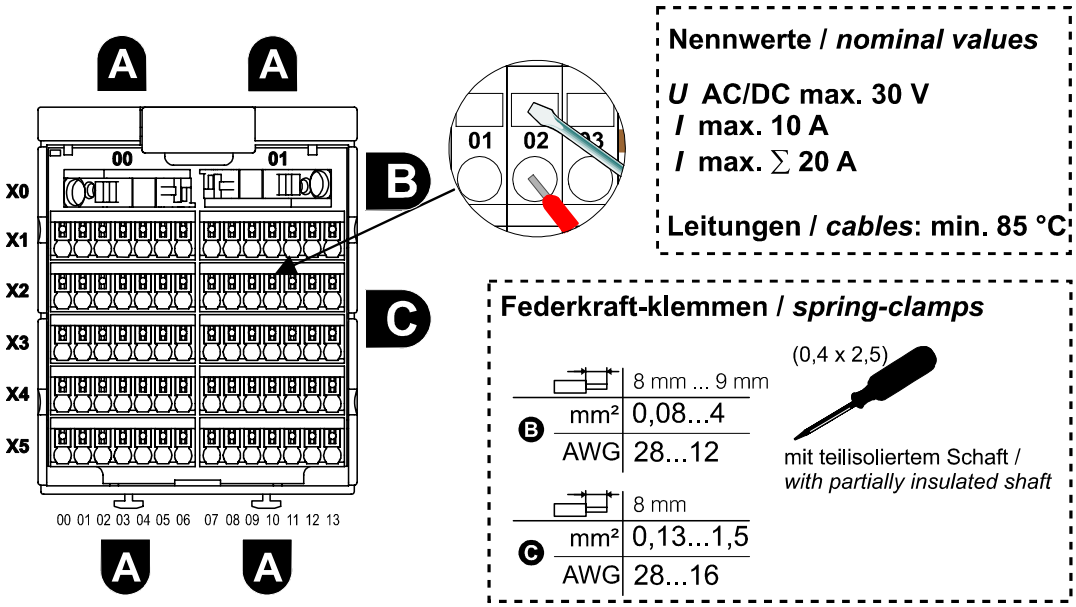
B

	Art.-No. 56078	Art.-No. 56079		
X0	grau / *grey*	grau / *grey*	X0	(00...09)
X1	grau / *grey*	grau / *grey*	X1	(00...09)
X2	(Us +24 V) braun / *brown*	(FE) gelb / *yellow*	X2	(00...09)
X3	(0 V) blau / *blue*	blau / *blue* (0 V)	X3	(00...09)

	Art.-No. 56080	Art.-No. 56081	Art.-No. 56084	Art.-No. 56111		
X0	(FE) gelb / *yellow*	(Us +24 V) braun / *brown*	grau / *grey*	(0 V) blau / *blue*	X0	(00...09)
X1	(0 V) blau / *blue*	(0 V) blau / *blue*	grau / *grey*	(FE) gelb / *yellow*	X1	(00...09)
X2	(FE) gelb / *yellow*	(Us +24 V) braun / *brown*	grau / *grey*	(Us +24 V) braun / *brown*	X2	(00...09)
X3	(0 V) blau / *blue*	(0 V) blau / *blue*	grau / *grey*	(0 V) blau / *blue*	X3	(00...09)

	Art.-No. 56109	Art.-No. 56110		
X0	(Us +24 V) braun / *brown*	(0 V) blau / *blue*	X0	(00...09)
X1	(Us +24 V) braun / *brown*	(0 V) blau / *blue*	X1	(00...09)
X2	(0 V) blau / *blue*	(FE) gelb / *yellow*	X2	(00...09)
X3	(0 V) blau / *blue*	(FE) gelb / *yellow*	X3	(00...09)

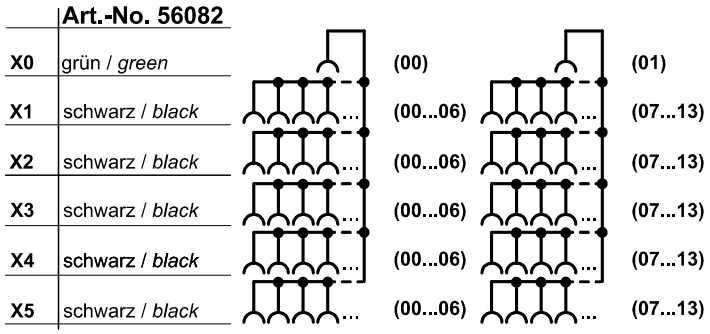
7.10.5.2 Terminal Overview Art. No. 56082



A **Modulverbindung / *Module-connection***

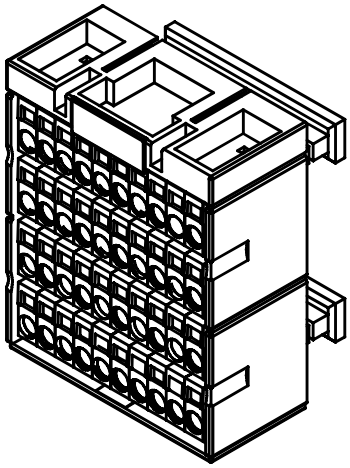
B **Einspeiseklemmme / *Input terminal***

C



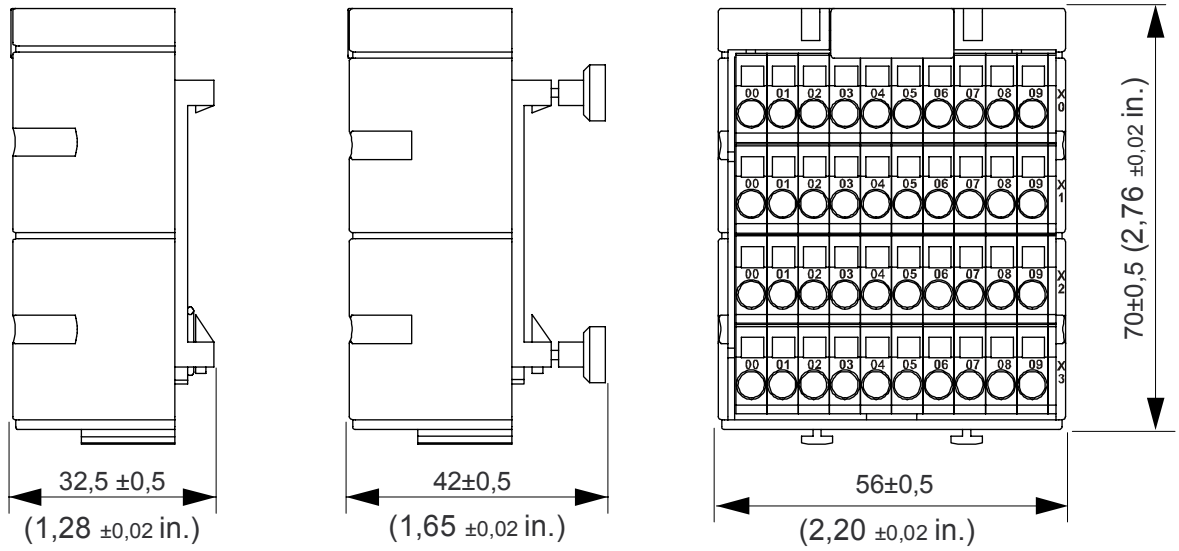
7.10.6 Technical Data of IMPACT20 Voltage Terminal Blocks

The IMPACT20 voltage terminal block is an expansion module for all IMPACT20 modules. It is fitted with 4 terminal rows that are electrically connected in various ways.



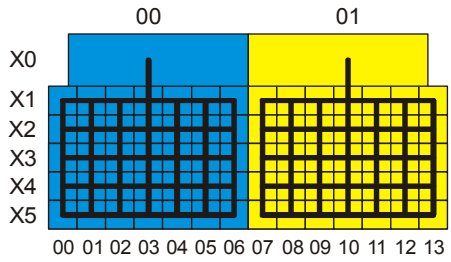
7.10.6.1 Technical Data Art. Nos. 56078, 56079, 56080, 56081, 56084, 56109, 56110, 56111

Technische Daten / *Technical data*	
Spannung / *voltage*	AC/DC max. 30 V
Strom / *current*	max. 10 A
Umgebungsbedingungen / *Ambient conditions*	
Arbeitstemperatur / *Operating temperature*	0°C to +55°C
Lagertemperatur / *Storage temperature*	-40°C to +85°C
Schutzart nach EN 60529 / *Enclosure type according to IEC 60529*	IP20
Mechanische Beanspruchung / Mechanical ambient conditions	
EN 60068 Part 2-6 Schwingprüfung / *Oscillation according to DIN IEC 60068 Part 2-6*	5 g
EN 60068 Part 2-27 Schockprüfung / *Shock according to DIN IEC 60068 Part 2-27*	15 g / 11 ms
Anschlussmöglichkeiten / Connection possibilities	
Federkraftklemmen / *spring clamps*	
Betätigungswerkzeug / *Operation tool*	mit teilisoliertem Schaft; / with partly insulated shaft Klinge / blade (2.5 x 0.4) mm
Anschlussquerschnitt / *Terminal cross-section*	0.14 mm² to 2.5 mm², AWG 25 … AWG 12
Abisolierlänge / *Stripping length*	8 mm to 9 mm 0.33 in.
Sonstiges / Miscellaneous	
Gewicht / *Weight*	70 g
Maße (L x B x H) / *Dimensions (L x W x H)*	

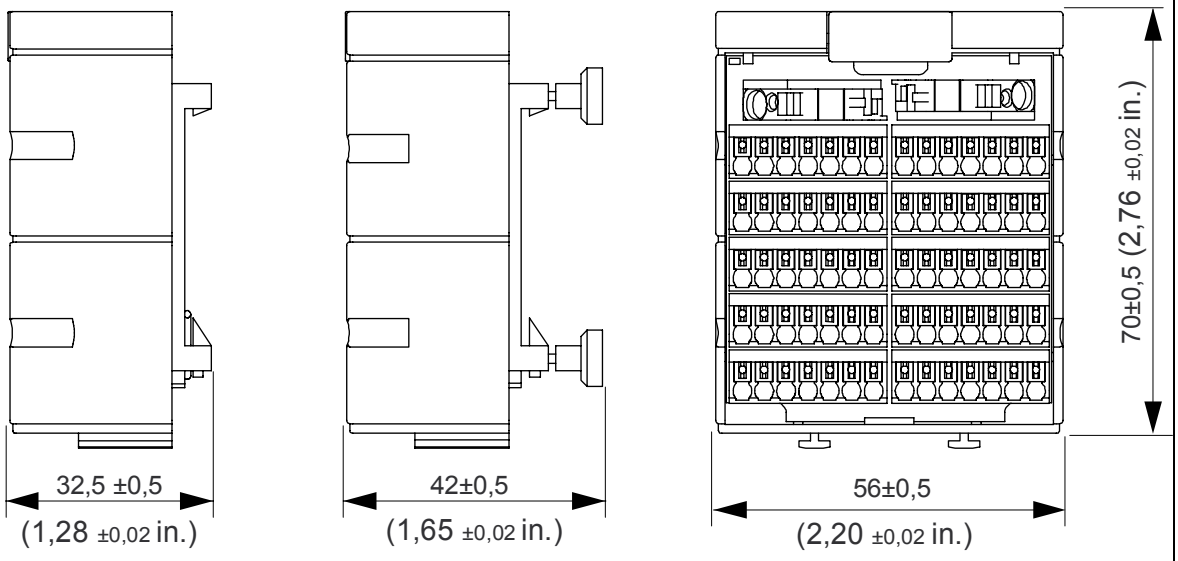


Montage / *Mounting*	
Einbaulage / *Mounting position*	beliebig / *any*
Abstand / *Distance*	beliebig / *any*

7.10.6.2 Technical Data Art. No. 56082

Art. No.	Benennung / *Name*	Ausführung / *Construction*
56082	Potenzialklemmenblock / *Potential terminal block*	
		gebrückt / *bridged*
Technische Daten / *Technical data*		
Spannung / *voltage*		AC/DC max. 30 V
Strom / *current*		max. 10 A mit Leitungen für / *with cables for* min. 85 °C
Summenstrom / *combined current*		20 A
Umgebungsbedingungen / *Ambient conditions*		
Arbeitstemperatur / *Operating temperature*		0°C to +55°C
Lagertemperatur / *Storage temperature*		-40°C to +85°C
Schutzart nach EN 60529 / *Enclosure type according to IEC 60529*		IP20
Mechanische Beanspruchung / *Mechanical ambient conditions*		
EN 60068 Part 2-6 Schwingprüfung / *Oscillation according to DIN IEC 60068 Part 2-6*		5 g
EN 60068 Part 2-27 Schockprüfung / *Shock according to DIN IEC 60068 Part 2-27*		15 g / 11 ms
Anschlussmöglichkeiten zwei Einspeiseklemmen / *Connection possibilities two Input terminals*		
Federkraftklemmen / *spring clamps*		
Betätigungswerkzeug / *Operation tool* (Wago No. 210-620)		mit teilisoliertem Schaft; / with partly insulated shaft Type 2, Klinge / blade (3.5 x 0.5) mm
Anschlussquerschnitt / *Terminal cross-section*		0,08 mm² … 4 mm², AWG 28 … AWG 12
Abisolierlänge / *Stripping length*		8 mm to 9 mm

Anschlussmöglichkeiten 2 x 35 Potenzialklemmen / *Connection possibilities 2 x 35 Potential terminals*	
Push In Feder-Anschluss / *Push In spring connection*	
Anschlussquerschnitt / *Terminal cross-section*	0,13 mm² … 1,5 mm², AWG 28 … AWG 16
Abisolierlänge / *Stripping length*	8 mm
Sonstiges / *Miscellaneous*	
Gewicht / *Weight*	107 g
Maße (L x B x H) / *Dimensions (L x W x H)*	



Montage / *Mounting*	
Einbaulage / *Mounting position*	beliebig / *any*
Abstand / *Distance*	beliebig / *any*

Glossary

Abkürzung/Term	Description
Actuator short-circuit	Short-circuit or overload at an output results in output switchoff.
PN	PROFINET IO
Byte	Equivalent to 8 bits.
DI	Digital Input
DIN	Deutsches Institut für Normung (German Standards Institute)
DIN TH35	Standardized DIN mounting rail (35x15 mm, 35x7.5 mm).
DO	Digital Output
Drag & Drop	A method of operating graphic user interfaces on computers by moving graphic elements by means of a pointer device.
I/O	Input/Output
EC Directive 2004/108/EC	EMC Directive.
EMC	Electromagnetic Compatibility.
EN	European Standard
ESD	Electrostatic Discharge
EEC	European Economic Community
FE	Function ground/earth.
GSD	"The Device Data Base file describes the technical features of a PROFINET product. This file is required to configure a PROFINET system and is provided by the device manufacturer.
IEC	International Electrotechnical Commission
IP20	Ingress Protection Protection type as per DIN EN 60529 1st digit = protection against contact and foreign bodies 2nd digit = protection against water 2: Protection against the ingress of solid foreign bodies above a diameter of 12.5 mm, protection against access by finger 0: No protection against inclusion
ISO	International Standard Organization
LED	Light Emitting Diode
PELV	Protective Extra Low Voltage.
PNO	Profibus Nutzerorganisation e.V. (German Profibus User Organization)
SELV	Safety Extra Low Voltage.
Sensor short-circuit	Short-circuit or overload at Terminal US

Abkürzung/Term	Description
Simatic Manager	Programming software for program-logic controllers made by Siemens.
PLC	Program-logic controller
UA	Actuator Power Supply
UI	Module and sensor power supply.
US	Sensor power supply.
VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V. (Association of German Machinery and Industrial Equipment Manufacturers)
VZ	Sign (+ or -)
ZVEI	Zentralverband Elektrotechnik- und Elektronikindustrie e.V. (German Electrical and Electronic Manufacturers' Association).

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